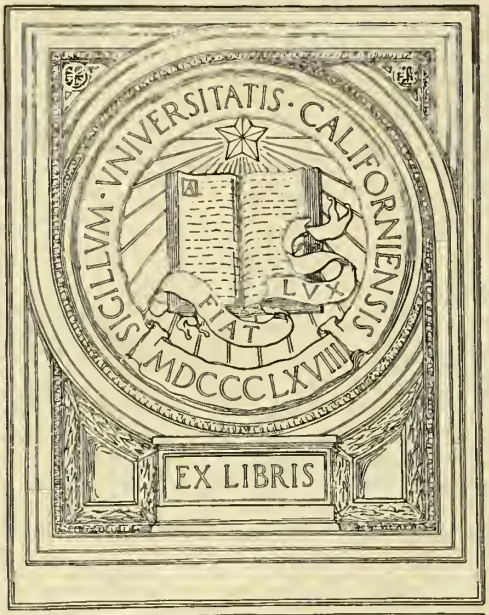
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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society

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VOL. XVI JANUARY, 1933 No. 1

PRIMARY CARCINOMA OF THE LUNGS*

EDWIN J. SIMONS, M.D.
Swanville, Minnesota

DESPITE increasing incidence of primary carcinoma of the lungs, it is considered exceedingly rare, according to Fishberg, and is never thought of when an atypical case of pulmonary disease is encountered. Blumgarten states that pulmonary carcinoma is one of the most difficult lesions of the respiratory tract to recognize early. So the purpose of this paper is twofold: (1) to emphasize the increasing frequency of the malady so that it will be borne in mind in the diagnosis of unusual chronic pulmonary conditions; (2) to enumerate some of its salient symptoms which should facilitate early diagnosis.

Incidence.—Foreign literature contains irrefutable proof of the increasing frequency of primary neoplasms of the lung throughout the world. But of more immediate concern is the incidence of the disease in North America, the United States and especially Minnesota. The first significant indication of an increase in the United States appeared as a special report of the Census Bureau in 1914. It attributed 371 of the 52,420 deaths from all carcinomata in that year to cancer of the lungs and pleuræ, an equivalent proportion of 0.7 per cent, or a rate of 0.6 per 100,000 population. These figures refer to the entire registration area.

In 1924 the San Francisco Cancer Survey reported that deaths in this country from cancer of the lungs and pleuræ had increased to 1,586 or a rate of 1.6 per 100,000 population. By 1927 these figures had increased to 2,012 and 1.9 per 100,000, respectively. Hoffman concludes that normal frequency of the disease is less than 2 per 100,000 population and that any figure above that average must be accepted as excessive local frequency. In a tabulation of the mortality due to this disease in the United States and Canada, he then shows that such excessive local frequency has been found in San Francisco, Boston, Buffalo and Winnipeg.

Ewing, in 1922, stated that the lung is the seat of the primary tumor in 1.0 per cent of cancer deaths. Eloesser quoted Rusk and Randolph as having gathered 22 carcinomata of the lungs from the University of California department of pathology since 1916, indicating an incidence of 1.36 per cent of all necropsies. McCrae, Funk and Jackson found at the Jefferson Hospital in Philadelphia, from 1924 to 1927, fifty-three cases of carcinoma in 621 autopsies, of which four were cancers primary in the lungs.

Seventeen cases were reported by Lichty, Wright and Baumgartner, two of which occurred before 1918, two during that year, and thirteen between 1918 and 1926. Symmers at Bellevue Hospital discovered three cases in 5,000 autopsies prior to 1917 and twenty-nine in 6,000 necropsies between 1919 and 1925. Moise found five cases in twenty-nine cancers and 375 consecutive autopsies, showing that cancer of the lungs comprises 1.38 per cent of all postmortem examinations, and 17.0 per cent of carcinomata.

Wells' records from the Cook County Hospital of Chicago cover 403 cancer cases involving thirteen sites. Of these, seventeen, or 4.2 per cent, showed the growth to be primary in the lungs. Fried at the Peter Bent Brigham Hospital did not find a case of the disease between 1913 and 1921, whereas there were five between 1921 and 1925. Moses records that between February 12 and June 1, 1924, three cases of primary carcinoma of the lungs were admitted to the same

*Read at the annual meeting of the Minnesota State Medical Association, St. Paul, May 25, 1932.

ward at Kings County Hospital. Rubenstone and Schwartz state that the records of the Mount Sinai Hospital fail to show a case prior to 1918, but show one case in each year 1918, 1919 and 1923, two cases in 1925 and six in 1926.

Most comprehensive of American studies of the incidence of pulmonary carcinomata is that of Rosahn, based on records from the Boston City Hospital. He found that from 1910 to 1928, among 3,004 adult autopsies, there were 314 cancers including twenty-one carcinomata primary in the lungs, an incidence of 0.7 per cent of all necropsies or 6.69 per cent of all carcinomata. His analysis shows that in the period 1925 to 1928, the percentage of all carcinomata in the total autopsies increased 20 per cent—from 10.29 to 12.35 per cent. But he found an even greater increase of pulmonary carcinomata. The percentage of total necropsies found to be carcinomata of the lungs increased 81 per cent—from 0.57 to 1.03 per cent—four times the percentage-increase of all carcinomata. Also, the percentage of pulmonary cancers among all cancers increased from 5.55 to 8.28 per cent, that is 49 per cent. These figures, together with those previously cited showing an actual numerical increase, are to be accepted as proof of an absolute increase.

In Minnesota, Barron's work deserves priority. In 1922 he presented statistics from the pathology department of the University of Minnesota establishing that the incidence increased from a total absence of such cases in 1,333 postmortem examinations during the eleven years from 1899 to 1911 to nine cases in 1,003 necropsies in the two and a half years from 1919 to 1921: an increase in percentage of total autopsies from 0.0 to 0.9. Goltz reported two cases at the Ancker Hospital, St. Paul, between 1912 and 1917 as compared with sixteen from 1918 to 1930. Vinson has reviewed the records of 102 cases seen in Rochester from May, 1925, to January 15, 1932. Of these, seventy occurred prior to 1931, thirty-one during that year, and one during the first half of January, 1932. Thus it is seen that nearly one-half as many cases were encountered in 1931 as during the five and one-half years preceding.

In Canada, Klotz of the University of Toronto collected twenty-four cases from 2,900 postmortem records in the department of pathology. They were divided into two groups, five found between 1910 and 1920, and nineteen in the six succeeding years. He contends that the increase is neither only relative nor apparent, but real, since a review of 1,000 necropsies on adults fifteen years ago revealed a much smaller incidence than has been found in the same number of autopsies in recent years. Hodge obtained the records of ten cases at the Montreal General Hospital during 1918-1928. Nine of them occurred from 1925 to 1928. Boyd found fourteen primary pulmonary carcinomata among the last 900 necropsies performed in the Winnipeg General Hospital—a percentage incidence of 1.5.

To summarize the statistical proof of the increasing incidence of the disease in North America, a tabulation of the figures presented by

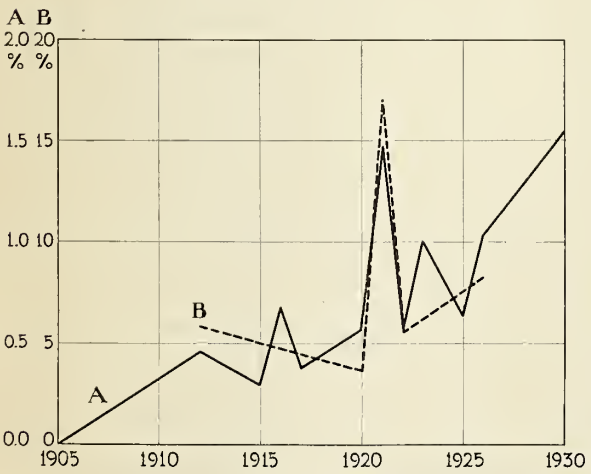
COMPOSITE TABLE OF THE INCIDENCE OF PRIMARY CARCINOMA OF THE LUNG IN THE UNITED STATES AND CANADA

Author	Years	Total Postmortems	Total Cancers	Cancers of Lung	Pulmonary Cancers % of All Autopsies	Pulmonary Cancers % of All Cancers
Barron	1899-1911	1,333		0	0.00	
Klotz (Canada)	1910-1920	1,000		5	0.50	
Rosahn	1910-1914	438	34	2	0.46	5.88
Hueper	1911-1921	5,000		33	0.67	
Barron	1912-1918	2,026		4	0.20	
Rosahn	1915-1919	526	45	2	0.38	4.44
Fried	1915-1925	1,400	136	5	0.35	3.67
Scott and Forman	1916	302		3	0.99	
Grove and Kramer	1917-1924	3,659		21	0.57	
Barron	1919-1921	1,003		9	0.89	
Rosahn	1920-1924	874	90	5	0.57	5.55
Klotz (Canada)	1920-1927	1,900		19	1.00	
Moise	1921	375	29	5	1.38	17.00
Maclachlan	1921	231		4	1.70	
McCrae, Funk and Jackson	1924-1927	621	53	4	0.64	7.54
Rosahn	1925-1928	1,166	145	12	1.03	8.28
Boyd (Canada)	1930	900		14	1.55	
Totals		22,754	532	137	0.60	6.57

eleven authors in the United States and Canada has been compiled. It includes 22,754 necropsies, 532 carcinomata in general, and 137 pulmonary cancers. Despite fluctuations, this table reveals a gradual increase in percentage of pulmonary carcinomata in total autopsies from 0.0 in 1899 to 1.55 in 1930, and a similar increase in the percentage of cancers of the lung among total cancers from 5.88 in 1910 to 1914 to 8.28 in 1925 to 1928.

When these figures are presented graphically, the resultant curves are similar to many of the German incidence-graphs. The graph of the percentage of cancers of the lung in all necropsies, in addition to depicting a gradual increase in incidence, shows also a major fluctuation in 1921. The curve of the percentage of all carcinomata found to be primary pulmonary carcinomata shows a slight general increase and a marked increase in 1921. Since such tabulations and graphs in Germany are conceded to prove an absolute increase of these neoplasms, such a conclusion is justifiable concerning the incidence in North America.

INCIDENCE OF PRIMARY CARCINOMA OF THE LUNGS IN THE UNITED STATES AND CANADA, 1905 TO 1930



A—Continuous line—Percentage of all autopsies that are cancers of lung.
B—Broken line—Percentage of all cancers found to be cancers of lung.

Such facts prove the increase of the disease. Even more impressive is its frequency as compared with that of cancer of other organs. Wells found that pulmonary carcinoma occurs as often as cancer of the breast and liver. Rosahn places it fifth in the sequence of carcinomata of all organs. Lichty, Wright and Baumgartner, and Gruber as well, state that it ranks next in frequency only to cancer of the stomach, breast, uterus and esophagus. In Hamburg in 1923, Kikuth found that carcinoma of the lungs was second among visceral neoplasms, and occurred one-third as often as cancer of the stomach. Realization of these facts leaves little excuse for failure to include it among the diagnostic possibilities of atypical chronic pulmonary conditions.

Diagnosis.—Brief statements as to sex and age incidence will serve as a transition to the more strictly clinical features. In a review of 3,264 cases, it was found that men are more susceptible in the ratio 3.4 to 1. All figures quoted refer only to those cases which have been diagnosed histologically. An analysis of 2,031 cases as to age frequency shows that 666 occurred between the ages of fifty and fifty-nine, 511 from sixty to sixty-nine, and 435 from forty to forty-nine. Thus it is seen that the sixth decade is the one of greatest incidence and that 79.3 per cent of the cases occur between the ages of 40 and 70.

Symptoms of primary cancer of the lungs arranged in the order of frequency have been determined, from an analysis of 1,032 cases, to be as follows: cough, expectoration, pain, dyspnea, pyrexia, emaciation, hemoptysis, dilated chest veins, cyanosis, night sweats, edema, dysphagia, vomiting, hoarseness and clubbed fingers. Since the percentage of correct diagnoses during life varies so greatly, Polevski has stated, the practicing physician must have, if he is to succeed diagnostically, some definite signs or a definitely pathognomonic symptom-complex. Although the symptoms of the malady are variable, it does present individual symptoms or combinations of symptoms which should lead one to suspect its presence.

Fried states that a sharp stabbing pain in the chest due to an early involvement of the pleura is one of the most characteristic symptoms. He emphasizes the point that no other disease, especially tuberculosis, will give such persistent pain with failure to respond to treatment. Pain in the chest is one of the cardinal symptoms of pulmonary neoplasm, and, since pain is exceptional in secondary carcinoma of the lung, when it does occur, it points to a primary cancer of the bron-

chi, lungs or pleuræ. In the parenchymal type of pulmonary cancer, pain is the only early symptom, yet, in the opinion of Paterson, it is not as constant as the blood-cough syndrome of the bronchial type. One author believes that pain is the most frequently elicited complaint, or, at least, it, more than any other symptom, draws attention of the patient to his condition. Haynes and Gaskell contend that, although pain is by no means always present, either severe continuous pain in the absence of pleurisy, or a constant boring pain with indefinite or unusual physical signs suggests pulmonary cancer.

Dyspnea in persons of cancer age, when not due to a valvular lesion, hypertension or emphysema, when combined with cough, pain in the chest and slight hemoptysis, should, Fishberg believes, excite suspicion. Polevski points out that, next to pain, dyspnea is the most frequent complaint that directs patients with pulmonary cancer to a physician. Dyspnea and orthopnea, or "chest oppression," are much more urgent in cases of malignancy of the lungs than in any other condition.

Seyfarth believes it is important when dealing with adults to keep cancer of the lung in mind in the presence of repeated hemoptysis, and another clinician has stated that hemoptysis is as indicative of carcinoma of the lung in an adult as of tuberculosis in a younger person. While the frequency of hemoptysis is uncertain, Hunt states it is commonly enough the result of cancer of the lung to keep such pathology in mind in cases where its cause is obscure. Still others point out that persistence of bloody sputum for weeks and months in an adult points definitely to the diagnosis of pulmonary malignancy.

Packard found in his cases that weakness and exhaustion were the prime reasons for seeking medical aid, and others regard a history of weakness as important in separating benign from malignant pulmonary neoplasms. Development of clubbed fingers in a patient of middle age requires a careful examination of the lungs for tumor.

Combinations of more than two pulmonary symptoms are often sufficient evidence to suggest malignancy of the lung. Bonner contends that even the small, solitary, nodular growth is indicated by pain, dyspnea, expectoration and fever. Persistent and progressive dyspnea, pain and dry cough out of all proportion to the extent of physical signs in the chest should always arouse suspicion of intrathoracic growths. Some believe that rapid loss of weight and strength, pain and dyspnea point to pulmonary malignancy. A recurring cough with pain and dyspnea, accompanied by small amounts of clear or blood-streaked mucus is indicative of bronchial carcinoma, especially when found in a patient of cancer age. Rizer and Habein maintain that when a patient has dyspnea, dull chest pain, hemoptysis and abnormal chest findings, malignancy of the lung should be considered. It is important to think of a pulmonary neoplasm when a patient of cancer age begins to cough and is "short-winded."

Bronchitis or pneumonia as a recent past history, followed by pain, hemoptysis, and dyspnea in a patient of cancer age, particularly with a negative pulmonary history up to that age, are frequently sufficient to justify a tentative diagnosis of primary pulmonary carcinoma. The insidious appearance of cough, blood streaked sputum, low fever, dyspnea, and pain in the chest in a person over thirty-five years of age should suggest not only tuberculosis or cardiovascular disease but also the possibility of neoplasm of the lung. Pain in the chest and dyspnea are found frequently associated with pulmonary carcinoma and seldom in early tuberculosis. Fried and Buckley state that when a middle aged person presents an abrupt onset of symptoms and signs of a rapidly developing intracranial lesion a metastatic cerebral lesion should be thought of, and that the lungs are the most common site of the primary tumor. Rubenstone and Schwartz state that pain, cough, expectoration, dyspnea, hemoptysis and emaciation are sufficiently pathognomonic symptoms to justify a presumptive diagnosis of pulmonary carcinoma. Another helpful diagnostic suggestion is that of Cooper, namely, that one of the most impressive things about his observations of the disease was the mildness of symptoms early in its course and the later prostration out of all proportion to the degree of involvement.

Through an analysis of these statements is reached the consensus of opinion that, in a person more than thirty-five years of age, previously well except for one or more attacks of influenza, bronchitis, or pneumonia within recent years, cough, pain in the chest, dyspnea, hemoptysis and loss of weight or strength are suffi-

cient evidence to justify a diagnosis of probable primary pulmonary carcinoma.

One of the great difficulties in the clinical diagnosis of intrathoracic cancer lies in the fact that the physical findings are variable and not peculiar to this disease. It is Fried's observation that in primary carcinoma of the lungs the physical signs are amazingly scant compared with the amount of tissue involved and the grave character of the lesion. Many other investigators support this view. However, there are physical signs which, when combined with one another or with certain symptoms, should lead one to consider an intrapulmonary new growth among the first diagnostic probabilities.

On inspection, unilateral limitation of expansion is one of the most common signs. If the disease has been present long, the chest is asymmetrical either in dimension or in contour. Also in advanced cases the superficial chest veins may be distended and edema of the chest wall, neck, face or arms may be found. Palpation usually demonstrates decreased tactile fremitus on the diseased side. Davidson says that tenderness is often noted in the intercostal spaces over the growth. An interesting fact noted by Fishberg and Steinbach is that patients having enlarged palpable cervical adenitis due to tuberculosis seldom show signs of active disease in the lung, but when glands are enlarged by metastases from pulmonary malignancy there are extensive lung changes. These glands are usually found by palpation between the heads of the sternocleidomastoid muscles.

Although the physical signs remain unilateral and sharply defined, percussion notes and auscultatory signs change in character from day to day. According to Parish, a change in physical findings from those of atelectasis to bronchiectasis is so typical of a pulmonary neoplasm as to be almost pathognomonic. Pulmonary cancer is urgently suggested when one side of the chest is flat and offers the characteristic resistance to the pleximeter finger from apex to base. Even in those cancers originating in the alveoli, light percussion will show dullness or flatness earlier than has been reported.

When breath sounds may one day be absent over a lobe and the next day heard with râles, bronchial obstruction is denoted and consequently cancer of the lung is suggested. Auscultation will show diminished breath-sounds in pulmonary carcinoma, in contrast to a tuberculous lesion or pneumonia. Simpson says that diminished breath-sounds at the base of the affected lung are often the only sign in an early case. Behier and Adler refer to "cornage" as a sound similar to that heard over the partly compressed trachea but occurring over the lung proper. It is considered by many as pathognomonic of pulmonary malignancy. Except cornage, absence of breath-sounds over one entire hemithorax, if not due to pneumothorax, which is excluded by percussion, is almost invariably due to a tumor of the lung or pleura with effusion.

When cornage is heard near the sternal border or in the upper half of the interscapular space, together with a flat note over the upper lobe of the lung, if no adventitious sounds are audible, it is characteristic of tumor of the lung. Staehelin's view is that a circumscribed area of dullness with decreased breath-sounds and decreased vocal fremitus may indicate almost certainly the diagnosis of pulmonary cancer. While often the earliest physical phenomena are limitation of expansion, dullness or flatness and decreased breath-sounds at one apex or posteriorly at the hilus, this same combination of findings is most pathognomonic of primary carcinoma of the lungs after effusion is ruled out.

Pleural exudates complicate pulmonary carcinoma so frequently that some of the distinguishing features of such effusions must be considered. The effusions of tumors of the lung occur after thirty-five and usually forty-five years of age, while tuberculous pleurisies usually occur at younger ages. Unlike tuberculous and metapneumonic pleurisies, those secondary to malignancy invariably have an insidious onset. Fishberg states that the former are characterized by flatness over the area containing fluid while immediately above the flat area anteriorly is a zone of tympany—the so-called Skodiac resonance. It is this tympanitic zone that is absent above an effusion complicating cancer of the lung. In these the flat note extends above even to the clavicle. Displacement of the mediastinum to the opposite side is common in tuberculous and metapneumonic effusion and is exceptional in cancerous varieties. More often, due to atelectasis, the mediastinum is drawn to the affected side. In pleurisies of tuberculous, rheumatic and metapneumonic origin, breath-sounds are audible over the lung above the effusion, as are

also râles. These are absent in cancerous effusion. Tapping does not relieve pain in cancerous effusions, but does in those of other origin. Reasonable suspicion of the presence of a primary pulmonary tumor is based on the occurrence of a unilateral pleural effusion, with or without bloody fluid, in the absence of definite signs of tuberculosis.

Kikuth, in a high percentage of his cases, found hemorrhagic pleural effusions. De la Camp maintains that it is exceptional in pulmonary carcinoma to find a sanguineous exudate. To the contrary, Staehelin contends that, when a hemorrhagic pleural exudate is found, of the three most frequent causes, tuberculosis, infarction, or carcinoma, the last is the most likely. Supporting this opinion, Goltz states that a hemorrhagic pleural exudate indicates malignancy in practically all chronic cases not associated with trauma.

Repeated sputum examinations should be made as an aid to diagnosis. The presence of tubercle bacilli does not exclude neoplasm. Brunn found tubercle bacilli in the sputum of 10 per cent of 626 cases collected from the literature. Tumor particles found in the sputum give an absolute diagnosis but occur only in exceptional cases.

Improvement in the diagnosis of intrathoracic malignancies is due to the universal use of the X-ray. The typical roentgenogram, as described by several authors, shows in the less frequent lobar or lobular type a solitary round shadow in the lung field, but in the more frequent hilar or bronchial type it shows a unilateral, triangular, central shadow involving the whole hilum and usually located at the sixth to eighth rib posteriorly. This roughly triangular shadow usually possesses an infiltrating border with strand-like processes invading the pulmonary tissue. Some observers state that in the early stages it is significant to find a shadow occupying the greater part of one lung with light coming through the apex and the costo-phrenic angle.

In conjunction with fluoroscopy and roentgenography, the intrabronchial injection of iodized oil, and artificial pneumothorax are helpful diagnostic procedures. Biopsy of supraclavicular glands, thoracoscopy and exploratory thoracotomy also are indispensable in diagnosing pulmonary cancer. Jackson asserts that complete diagnosis without the bronchoscope is not possible unless the X-ray is positive. Brunn believes bronchoscopy is the most valuable adjuvant in diagnosis. One German authority is even more emphatic when he says that the bronchoscope is the only aid from which improvement in diagnosis in the early stages can be expected.

To obtain earlier and more frequently accurate diagnoses, Staehelin advocates that carcinoma of the lung be considered: (1) when pleurisy will not heal and especially when the exudate is hemorrhagic; (2) when gradual symptoms of bronchial stenosis or a space-limiting process in the thoracic cavity occurs; (3) when hemoptysis appears without other cause; (4) when cachexia accompanies seemingly harmless symptoms; (5) when chest-pain is present without other etiology; (6) when there is found an unexplained disease of the respiratory organs especially in tuberculosis suspects when tubercle bacilli can not be demonstrated.

FRACTURE WORK IN THE SMALL COMMUNITY*

B. J. Branton, M.D., F.A.C.S.
Willmar, Minnesota

TWENTY-FIVE years of medical practice in the same community is filled with many successes which well overcome the too many disappointments. Especially is this true in fracture work.

During this quarter of a century we have seen the results of the excellent work of education in tuberculosis. Bone and gland tuberculosis are becoming practically unknown. The propaganda for early eradication of pre-cancerous conditions has made the public as well as the doctor cancer minded.

Has the same education been directed towards fractures—their care and end-results? Do the laity as well as the criticising over-zealous doctor

*Read before the annual meeting of the Minnesota State Medical Association, St. Paul, May 24, 1932.

still need enlightenment with regard to the reasons for the end-results?

I believe both groups need education and that when fractures are viewed in the light of their occurring in human beings made up of flesh and blood—not mere pieces of wood and steel—subject to all the different ills that human bodies are heir to, then and not till then will we get the cooperation from our patients and their friends which we are entitled to in this work.

Various national surgical societies have entered the field of education along this line. It is my hope and trust that their work will be of such scope that it will bear abundant fruit, first with the profession and through them with the public.

In rural communities the facilities for fracture care are not so abundant but the gray matter which a recent speaker said was the first essential in fracture treatment is present and must be used if we are to succeed. Common sense may well be added to gray matter to attain success.

Sound principles of treatment must go hand in hand with anatomic knowledge and the mechanics of levers must be studied thoroughly no matter what type of splint or apparatus the surgeon may elect to use.

In the country districts transportation is a problem: a careful driver and a good mattress are essentials. In the armamentarium of the physician, Thomas splints both for fractures of the arm and leg with knowledge of their application will usually make the patient comfortable during a journey of any distance.

I have seen patients after a ride of many miles in an automobile, with fractures which would have been simple of reduction if seen at the place of the accident. The injured member has become swollen, the deformity exaggerated, the tissues lacerated and reduction almost impossible, all of which a simple splint of boards and a pillow would have prevented.

Many fractures which are simple in the beginning, if handled roughly before splinting, may become aggravated or even compound in careless hands. We should therefore teach gentleness in their handling and remember the axiom: "Splint them where they lie."

The automobile, gasoline tractor and other modern power-equipped machinery have brought with their use fractures which I may call unclassical. Textbooks do not contain descriptions of them. Therefore each fracture must be considered as an individual problem and treatment carried out accordingly. Standardize treatment if you will, but individualize you must in most fractures.

One must always remember that no matter what the extent of the fracture, the soft parts about it are injured. Naturally the more serious the fracture of the bone, the greater the damage to the surrounding tissues. We should impress this truth most forcibly on the minds of the injured individual.

Every doctor and hospital should have available an X-ray machine of some type competently operated. X-ray plates should be taken frequently and read correctly.

The X-ray, a wonderful instrument of percision when its product is viewed by those expert in its use, becomes many times a destroyer of confidence when this same product is seen through the eyes of the uninitiated laity—facts being distorted to the individual's wish. Education here again is needed.

Reduction should be accomplished as soon as possible, remembering that the earlier the reduction, the easier it is accomplished, the less the amount of injury to the soft parts and the quicker the healing.

If an X-ray machine is available plates should be obtained before reduction, but too much time should not be lost before reduction is made. Plates should always be made at once after treatment and at frequent intervals until healing has taken place. This will give untold relief from worry and add to one's peace of mind.

Extreme care and gentleness are essential in manipulation for diagnosis. If pain is marked, do not attempt to elicit crepitus; wait rather for an X-ray.

Splints of many shapes and sizes are made available by the manufacturers but one must not be carried away by clever salesmanship to the point of investing in unusable apparatus. Many things advocated today, like the books of yesterday, will become obsolete tomorrow. A splint should be selected for a case only after diagnosis; do not fit the diagnosis to the splint at hand.

A man endowed with a mechanical turn of mind and ordinary ingenuity can devise with the aid of a blacksmith and harness-maker most of the necessary equipment in the way of splints. A carpenter will supply with his tools and a few pieces of lumber a satisfactory Balkan or other

frame—the hardware store supplying him with pulleys and rope. The product may not look so well but will give the same results. In these times of lessened incomes it is not looks but results we are after and one cannot be censored for using rather homely equipment.

Plaster casts, so necessary in many cases, can easily be made from dental plaster or plaster bandages purchased in sealed containers ready for use. Several widths should be available.

In the treatment of fractures one should be frank with himself. He should write adequate daily records though it does seem irksome at times, and see the patient more often even than the patient may think necessary, thus oftentimes protecting himself from future censure.

Pain in the fractured part should be studied with care as it is the beacon light of trouble in the form of pressure, swelling, deformity, infection and the unusual complications. A fracture properly reduced is not ordinarily painful to any great degree.

Nervous, complaining individuals should be handled with care. Consultation more frequently used will still unnecessary fears.

Blood Wassermann tests should always be taken. Many a poor result and lengthened convalesence are due to the earlier worshiping of Bacchus and kindred gods.

In the seven years (1925 to 1931 inclusive) 1,188 cases have been X-rayed at our hospital as potential fractures. Twenty-six (plus) per cent of these have proven to be frank fractures. Approximately 5 per cent of these have been reduced by open operation, the remainder having been treated by the closed method.

Open operation has been necessary because of inability to hold the fragments satisfactorily in position in compound or severely comminuted fractures or where interposition of soft parts renders this impossible. It has been resorted to in the hope of obtaining a better functional result. Closed reduction has always been tried first in ali but the compound fractures.

Foreign material such as screws, nails, plates and wire, has been used as little as possible in open reduction because it has been found that in the great majority of cases the position is well maintained through the complementary pull of the muscles after the fractured ends are put in correct position and the part is encased in splints or casts.

THE EQUIPMENT NECESSARY FOR THE FIRST AID TREATMENT OF FRACTURES*

Roscoe C. Webb, M.D.
Minneapolis

FRACTURES are on the increase throughout the world and Minnesota is no exception. Just as it is necessary to establish a Minnesota Highway Patrol Organization because of the increase of travel throughout our state so is it necessary to provide for the results of the hazards of travel and although Minnesota is not the first to apply the fracture campaign to its highway patrolmen, to my knowledge Minnesota has, as usual, "placed" in this respect in the race to give its citizens the best of medical care.

Cancer and tuberculosis problems have been taken up by lay organizations and the benefits derived from the more general application of the known truths resulting from these lay efforts are thoroughly appreciated by all thinking citizens.

The fracture program which has been carried on during the past fifteen or more years is beginning to show results. Our soldiers in France fourteen years ago were taught the proper application of first aid in fractures. They also demonstrated that they were able to learn first aid for fractures. I recall overhearing one of the enlisted men working on my surgical team in France while transferring his duty of holding a broken lower extremity to another enlisted man say to the second man, "Now hold him carefully because if you don't, it will cause shock." I am sure that our enlisted men who were taught the

*Part of the First-Aid Clinic for Minnesota Highway Patrolmen presented at the annual meeting of the Minnesota State Medical Association, St. Paul, May 25, 1932.

first aid care of fractures fourteen and fifteen years ago are still very useful citizens in the presence of a fracture injury.

The Boy Scout organization is carrying on this educational program and the knowledge of the average boy scout who comes up for his First Aid Merit Badge again shows that this subject can be taught successfully to non-medical people. In fact, the subject is so elementary that medical school teachers have sometimes neglected to teach their studentts the principles of first aid in fractures.

Not long ago I saw a boy with both thigh bones fractured who had been placed in an automobile and carried forty miles to a hospital without first aid splints. I saw another patient with a fractured femur who had been transported without splinting in an automobile fifteen miles across country from one hospital to another which possesses an X-ray apparatus and the patient was X-rayed and again placed in the automobile and carried fifteen miles back to the first hospital for continuation of his treatment. Let us hope that both trips were made on our beautiful Minnesota paved roads.

The Boy Scouts who have completed their first aid training and are applying for their merit badges possess a very complete knowledge of first aid for fractured bones. They know of the danger of permitting the fractured ends of the bone to penetrate the skin and cause a compound fracture. They are familiar with the use of boards and other available material for making temporary splints. I have been a first aid merit badge examiner for the boy scouts during the past ten years and I have been astonished to find that nine out of ten of these boys know that splints should go beyond the joints at each end of the broken bone and should be well bandaged to these parts beyond the joints. Many of them know that if the splint does not go beyond the joint above the fracture that, in order to be of value, the splints would have to be bound too tightly and would act as a tourniquet.

Doctor William Darrach, formerly Dean of Columbia University Medical School, in the Oration on Fractures presented in October, 1931, before the American College of Surgeons, said:

"The injuries resulting from fractures are not limited to those occurring at the time of the accident. Unwise attempts to use the injured extremity may cause or increase displacement of fragments, increase the laceration of soft parts, and perhaps lead to penetration of the skin by ends of bones. The same additional trauma is often due to the awkard efforts of the bystander. A man is struck by an automobile and his leg is broken. Except for the broken bone, without displacement, the original injury may be merely slight periosteal tear and mild contusion of soft parts, but he is helped to his feet and the leg gives way, the fragments slide by each other, thus stripping off the periosteum and tearing the muscles. He falls to the ground only to be picked up and carried to the sidewalk with the leg dangling. Larger blood vessels are torn, the bone end comes through the fascia, perhaps the skin, even the trousers. He is laid at rest with a coat beneath his head and surrounded by people anxious to help. Someone sees his leg is crooked and straightens it out. The exposed bone end re-enters the wound with a bit of trouser and the dirt of the street. Again, he is lifted up and carried to a car or ambulance. This time, someone carries the injured leg with better intentions than coördination and the ends of the bones are churned around in their bed of lacerated tissues and the contaminating organisms well disseminated throughout the area. During his ride, and in the transfer to the accident ward or the doctor's office, unless he has been carefully splinted, there is more jolting and more damage. Would that his troubles were over but too often the sad story continues. Lack of sufficient protection as he is lifted to and from the X-ray table and as he is being anesthetized, examinations which are too rough or extensive, or repeated, result in still more injury.

"Compare this exaggerated picture with a similarly injured man who is allowed to remain where he is until a proper splint can be applied, or at least can have someone pull hard on his foot as he is being lifted and carried, whose examination is thoroughly but gently carried out, and whose treatment is instituted with but little additional injury. The difference in these two cases as regards time of disability and amount of permanent functional disturbance is tremendous."

At the Boston Conference on the Treatment of Fractures in April, 1922, a syllabus was prepared and under First Aid the following directions were given:

Every effort should be made to avoid any injury additional to that of the original trauma.

1. "Splint 'em where they lie!"
2. Avoid any unnecessary manipulation.
3. Transport with extreme care.
4. Treat any existing shock.

The American Medical Association in 1926 appointed a Coöperative Committee on Fractures and the published work of this Committee is known as the Primer on Fractures. For first aid to fractures they have listed the following splints and accessories for the doctor's automobile:

One Thomas leg splint half ring.

One Thomas arm splint, half ring.

One half dozen basswood splints, two and one-half inches wide.

line of Fracture Treatment" published by this committee in the March, 1931, Bulletin of the College of Surgeons stresses the importance of First Aid. As a result of the efforts of the sub-

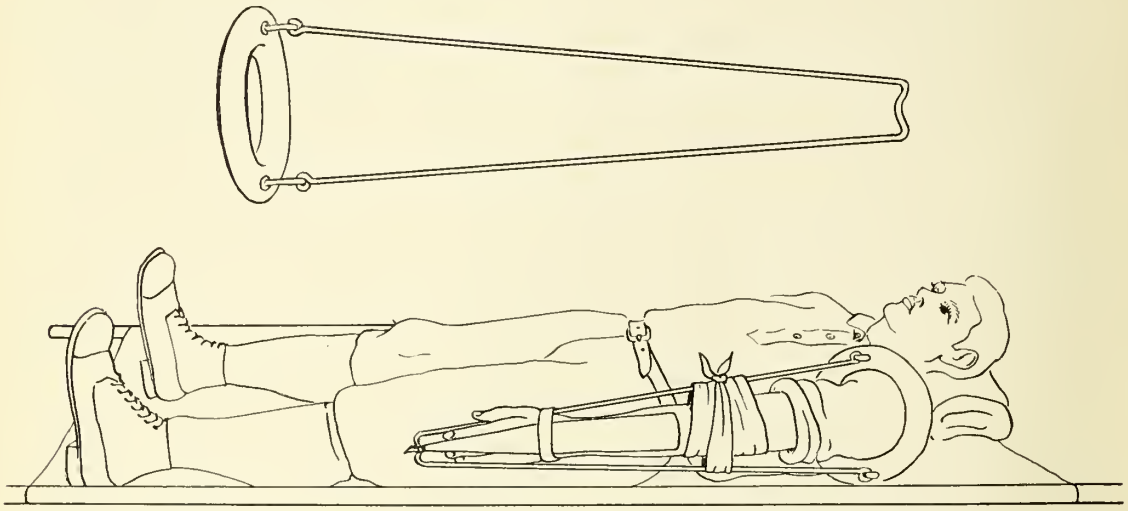


Fig. 1. Thomas-Murray hinged splint for upper extremity fractures. Note slings to arm, traction on forearm, elbow extended. Whole upper extremity at side of body. Injured arm ready for transportation, guarded and protected.

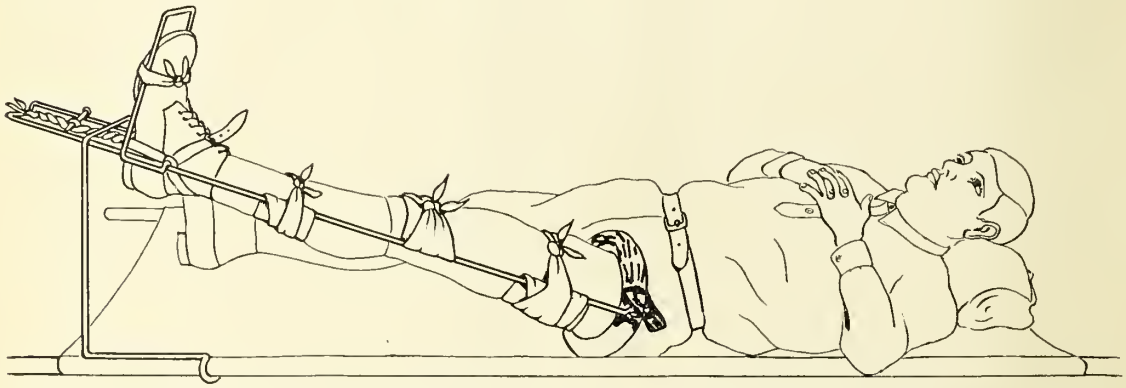


Fig. 2. Indicating the use of the Keller-Blake splint for transportation and first treatment of fracture of the leg and thigh. Note elevation of lower extremity, slings, traction. Note the half ring which lies under the thigh against the tuberosity of the ischium and the strap and buckle over the thigh anteriorly to hold the half ring snugly in place.

One tourniquet.

One half-pound can of ether.

Six muslin bandages, two inches and three inches in width.

One small roll of adhesive tape.

One package of safety pins.

The American College of Surgeons established a Commitee on the Treatment of Fractures ten years ago under the chairmanship of Doctor Charles L. Scudder. The "Principles and Out-

committee on Ambulance Equipment for First Aid in Fractures, of which Dr. Robert H. Kennedy of New York is chairman, the second edition of this outline will contain the result of their work, which is as follows:

An ambulance should carry the Thomas-Murray hinged arm splint and the Kellar-Blake hinged half-ring splint with web strap and buckle. In addition there should be a box containing all the other necessities for first aid in frac-

tures. The contents will vary according to the method of application used. One typical box is equipped as follows:

1. 9 heavy muslin hammocks, 6″ x 18″.
2. 9 metal clips (used commercially as paper clips and known as Acco Clamps No. 325).
3. 2 portions of cotton sheet wadding, 6″ x 6 yards, folded to 16″ lengths.
4. 8 muslin bandages, 3″ x 36″.
5. 8 wooden tongue depressors.
6. 4 strips of adhesive. 1″ x 16″.
7. 8 thicknesses of 1/16″ basswood splint, over one of which the strips of adhesive (No. 6) are placed.
8. 4 strands of 16 ply clothes line, two, 2 feet long; the other two, 3 feet.
9. ½ roll absorbent cotton, Grade B.
10. ½ pound extra clothes line, 16 ply.
11. 4 3″ gauze bandages.
12. Roll of 2″ adhesive.
13. 1 bandage scissors.
14. Sterile gauze for compound fractures.

CONCLUSIONS

The practical application of proper first aid treatment equipment by our enlisted soldiers was proven possible in the late war.

First aid in fractures is being successfully taught by the Boy Scout organization.

Every ambulance operating in Minnesota should carry a standard set of splints and equipment for proper first aid treatment of fractures.

All hospitals should possess similar splints for purposes of exchange with the ambulance when patients are brought in wearing these splints.

The excellent body of men making up the Minnesota Highway Patrol Organization should be given individual practical instruction in the application of proper first aid equipment to fractures and it would be an advantage to those injured on our highways if the patrolmen carried proper splints in their automobiles.

Every physician in general practice throughout Minnesota should have in his office the equivalent of the above outlined ambulance equipment for emergency use if located where properly equipped ambulances are not available.

SUBDIAPHRAGMATIC ABSCESS AND LIVER ABSCESS*

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IT is my purpose to present some of the more important facts relating to subdiaphragmatic and liver abscesses as obtained from a short survey of the literature. A case representative of each condition will also be reported.

Barlow of England in 1845 and Leydon of Germany in 1886 were the first to describe the clinical picture of subdiaphragmatic or subphrenic abscess and distinguish it from thoracic abscess. In 1880 surgery was first attempted to relieve this condition.

Anatomy.—The subdiaphragmatic or subphrenic space may be divided for purposes of description in various ways.

For practical purposes a subdiaphragmatic space may be defined as any cavity having the diaphragm as one of its walls. It is located in the space between the liver and the diaphragm, which is subdivided into an anterior and a posterior space by the coronary ligaments and further by the lateral ligaments into right and left anterior and posterior spaces.

Abscesses in the anterior space give rise mainly to intra-abdominal symptoms, while abscesses in the posterior space give rise mainly to thoracic symptoms.

Frequency.—It is difficult to arrive at a very accurate estimate of the frequency of subdiaphragmatic abscesses. John D. Weaver reported subdiaphragmatic abscesses occurring twenty times in a series of 2,400 cases of appendicitis operated by himself. This condition occurs at any age, but mostly from the ages of twenty to thirty, males being more susceptible than females in the proportion of four to one.

Etiology and Pathology.—Lance in 1909 an-

*Read before the annual meeting of the Minnesota State Medical Association, St. Paul, May 25, 1932.

alyzed 1,000 cases of subdiaphragmatic abscess to determine its etiology and reported as follows: 20 per cent caused by appendicitis, 30 per cent by stomach and duodenal lesions, 13 per cent by lesions of the liver and gallbladder, and the remaining 37 per cent by miscellaneous diseases of the pancreas, spleen, large intestine, pleura, etc.

Wayne Babcock states that 33 per cent of all subdiaphragmatic abscesses are caused by rupture of a gastric or duodenal ulcer; 16 per cent by appendicitis; 16 per cent by liver disease; and the balance from various causes including trauma to the abdomen.

Del Valle and Malbran state that 30 to 35 per cent of subdiaphragmatic abscesses are caused by peritonitis following appendicitis, and 20 per cent by peritonitis the result of gastric ulcer.

The infection arrives at its subdiaphragmatic site in one of four ways: (1) by the peritoneal route; either by direct extension from an infection in an organ which is adjacent to the diaphragm, or by intraperitoneal transmission as from an appendiceal infection traveling up the right lumbar gutter to the right subdiaphragmatic space; (2) by the extraperitoneal fascial planes, as from a retrocecal appendiceal infection progressing upward posterior to the ascending colon, which, according to Blake, is the cause of 50 per cent of the right sided subdiaphragmatic abscesses; (3) by a pylephlebitis from a mesenteric vein extending into the portal vein and resulting in an abscess on the surface of the liver with a later perforation into the subdiaphragmatic space; (4) by extension of infection along the lymphatics of the deep epigastric artery.

Esengraff found the intraperitoneal route involved in two-thirds of 106 cases of subdiaphragmatic abscess studied. This is readily explained by the tendency of appendiceal infections to drain intraperitoneally either upward along the right lumbar gutter and therefore to the right subdiaphragmatic space or downward to the bottom of the pelvis.

According to various authorities the subdiaphragmatic abscesses complicating appendicitis are multiple in over 50 per cent of the cases.

According to Gruneisen, pleural complications occur in 60 per cent of right sided subdiaphragmatic abscesses. The pleurisy may be fibrinous, serous or purulent. Occasionally the abscess may perforate the diaphragm and form an empyema. Taking the subdiaphragmatic abscesses as a whole, the pleura is unaffected in 67 per cent according to Perutz and 78 per cent according to Piquands.

Symptoms and Physical Findings.—Whenever symptoms of right lower thoracic disease or upper abdominal disease appear following acute or chronic abdominal infection one should suspect subdiaphragmatic abscess. The patient is septic, has pain in the upper abdomen, often with hiccough, nausea and vomiting. If the abscess involves the posterior space pain often radiates to or is had in the right shoulder area. The patient has chills and profuse sweating with irregular fever. There is usually cough and often pain in the right lower chest of a pleuritic character.

These symptoms may begin a few days or several weeks after an appendectomy. In about one to two weeks from the onset of a subdiaphragmatic abscess it has developed to such an extent that a diagnosis can be made.

Examination will usually show limitation of excursion of the right lower chest. Local tenderness is often present over the lower chest or subcostal region. This becomes more definite and remains localized as the process develops. Also slight edema of the skin may develop in the same tender area.

There is often dullness over the base of the right lung, due either to an accompanying pleural effusion or the elevation of the diaphragm from the abscess beneath it. The liver may likewise be displaced downward. Occasionally a pleuritic friction sound is heard over the base of the right lung and often moist râles are present.

If the abscess is in the anterior space and "points" inferiorly a tender swelling may be demonstrable at the costal margin.

The fluoroscope and X-ray film are valuable in these cases and show an elevation or "doming" of the right diaphragm with limitation of excursion on the involved side. If the abscess is on the left side the diaphragm will show less elevation but the physical findings will be similar with perhaps an increase of the gastric symptoms.

Treatment.—Aspiration should only be used as part of the actual operative procedure.

According to Grove and others, incidence of subdiaphragmatic abscesses can be much decreased by longer and more thorough drainage of appendiceal abscesses. Occasionally a lumbar stab wound may facilitate better drainage. The

half-sitting and abdominal postures postoperatively are also important prophylactic measures.

If the subdiaphragmatic abscess is found anteriorly, an incision may be made parallel with the costal margin and the abscess carefully mopped out after walling off the general abdominal cavity. Tube drains inserted should be removed fractionally, pulling them out a little each day over a long period of time.

If the abscess is in the posterior subdiaphragmatic space, or its location not definitely known, the retroperitoneal technic suggested and used by Nather and E. W. Ochsner is very advisable. An oblique incision is made over the twelfth rib, which is resected subperiosteally. The muscles are divided transversely at the level of the first lumbar spine. By blunt dissection, the renal fascia is exposed and followed upward where it becomes continuous with the peritoneum on the diaphragm. The peritoneum, which is edematous over the abscess, is bluntly separated from the diaphragm. Aspiration may be used at this stage to check for both supra- and infrahepatic abscesses, which combination is present in 50 per cent of the subdiaphragmatic abscesses complicating appendicitis, according to Nather and Ochsner. The abscess is opened bluntly, large drains being placed and left for an ample period.

It is not advisable to use transpleural drainage since the pleura is sterile in about 75 per cent of the cases. If the transpleural method of drainage is used the pleura will become infected in 30 to 35 per cent of the cases.

Prognosis.—If not operated upon, 80 to 90 per cent of patients with subdiaphragmatic abscess will die, only a few recovering by rupture of the abscess into a hollow abdominal viscus or into a bronchus.

The operative mortality is 20 to 30 per cent according to Blake, but this may be reduced by early operation. Gatewood reports 30 per cent mortality in forty-one cases from the Presbyterian Hospital, Chicago. Choyce states that early operation results in a mortality of 30 to 40 per cent. Delayed operation may result in new loculi and a recurrence of fever and sepsis.



Fig. 1 (Case 1). Right subdiaphragmatic abscess (October 19, 1927).

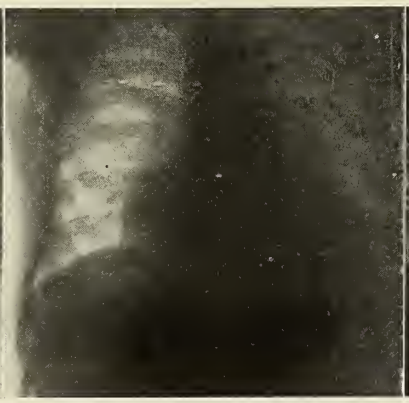


Fig. 2 (Case 1). Right subdiaphragmatic postoperative pleural thickening (October 26, 1927).

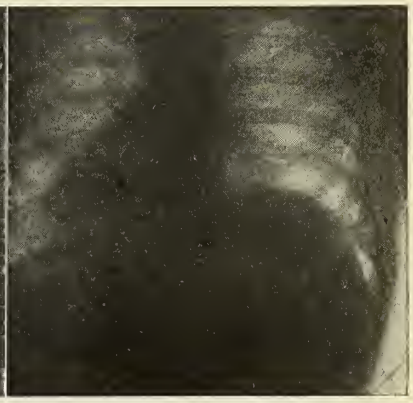


Fig. 3 (Case 2). Liver abscess (March 23, 1932).

CASE REPORT

Case 1.—O. E., a farmer, thirty-four years of age, gave a fairly typical ten year history of duodenal ulcer and had been under medical treatment intermittently.

He developed a very acute appendicitis and was promptly operated upon October 2, 1927, the abdomen being closed without drainage, since no free pus was present.

The patient did not do well postoperatively, his temperature varying from 100 to 103 degrees. On October 7, he raised some bloody sputum, had pleuritic pains in the right lower axilla, and showed dullness and absence of breath sounds at the right lung base with medium moist râles but no bronchial breathing.

On October 15, the patient began to have occasional emesis daily. Fluoroscopic and X-ray examination on October 19 showed doming of the right diaphragm with limited excursion. The white blood count had gradually increased to 19,000. By October 20 a tender swelling at the right costal margin lateral to the gallbladder was noted.

At operation, October 21, an oblique incision was made below the costal margin and the free abdominal cavity entered. Exploration was negative except for a subdiaphragmatic abscess in the right posterior and anterior subdiaphragmatic space. This was bluntly opened

after amply protecting the general peritoneal cavity. The wound was closed with ample drainage. The patient made an uneventful recovery and the wound was entirely healed in seven weeks. Physical and X-ray findings of a thickened pleura persisted for several weeks after the operation.

Since Dr. Collins presented a very fine paper on liver abscess before the Tuesday General Section I shall limit my remarks to a few differential points and the presentation of a case.

Liver abscesses are mainly of two types—amebic and pyogenic. The amebic type responds very well to emetine given hypodermically either with or without drainage and has a mortality of 5 per cent according to Wilmoth. Chatterji reported a 2 per cent mortality in 186 cases treated by emetine hypodermically and aspiration.

Pyogenic or bacterial liver abscesses are usually multiple and have nearly a 100 per cent mortality. A liver abscess may be secondary to any septic process but is often secondary to appendicitis. The symptoms are very similar to those produced by a subdiaphragmatic abscess, but offer fewer localizing signs. A mild jaundice is usually present.

The source of the infection in the case we report is indefinite. A moderately severe type of infectious jaundice was epidemic at this time in our section of Minnesota and we had personally seen about 100 cases. Fairly typical influenza was also prevalent at about the same time.

Case 2.—D. L., a farmer, fifty-six years of age, born in Belgium, had always been well until two months before he was seen in consultation, January 19, 1932. He gave a history of severe chills, fever, profuse sweating, general body aches and pains two months previous. After a few days, nausea and vomiting appeared. He had improved after one week, was up and about, and then gradually became weaker. He had become bloated and constipated, developed a hiccough with occasional vomiting, a septic type of fever (normal to 104.5 degrees) and some cough.

The only significant findings on examination were moderate bloating and some moist râles at the right base.

On February 8, the patient became moderately jaundiced. This did not entirely subside during the balance of his illness. Septic fever, nausea and vomiting continued. On February 17, the white blood count was 47,000 and varied from 20,000 to 30,000 for the duration of the illness. The urine showed traces of albumin, sugar, and bile, and a few leukocytes and red blood cells at nearly every examination. X-ray films and fluoroscopic examination on February 18 were negative. The diaphragm moved equally well on the right and left sides. From February 21 to March 23 the patient received six transfusions of citrated blood because of his anemia and sepsis. The clotting time was 13.5 minutes and the blood calcium was 2 mgm. per 100 c.c. of blood. Under parathormone and calcium gluconate intramuscularly the clotting time and blood calcium returned to normal. Insulin was required to bring the blood sugar down from 250 plus to near normal.

Following these measures the patient's general appearance was much improved. The jaundice lessened, the appetitie increased and there was less nausea and vomiting. The septic course continued with chills and temperature varying greatly, from 95.6 to 105.8 degrees (rectal) on one occasion within a period of ten hours. Still the patient had no complaints except chills and occasional nausea and vomiting. He had no cough and no pain. Examination showed a dullness in the right axilla to the fourth intercostal space with moist râles at the lung base. The liver was now palpable at the right costal margin on deep inspiration and was slightly tender. X-ray and fluoroscopic examination showed a doming with a limitation of the excursion of the right diaphragm. A tentative diagnosis of liver abscess was made.

On March 24, operation was carried out under novocaine field block and a small amount of ether by inhalation. The spleen was found to be twice its normal size. The stomach, duodenum, gallbladder, appendix, and pelvis were normal. The liver was normal in color and consistency with a few adhesions over the upper right lobe. An area of induration three inches in diameter with central fluctuation in the right upper lobe was aspirated and a heavy greyish yellow pus was obtained. The anterior portions of the seventh and eighth ribs on the right were removed subperiosteally and the underlying tissues sutured to the diaphragm and the abdominal cavity well packed off. The electric cautery was used to open into the abscess cavity of about 60 c.c. capacity. The liver wound was packed with gauze and hemorrhage was slight. The abdominal wound was closed with adequate drainage.

The patient appeared much improved for three days but septic temperature recurred and the patient died eight days postoperatively. Post-mortem was refused but we feel that multiple liver abscesses were the cause of death.

GRADUAL DECOMPRESSION OF THE BILIARY SYSTEM*

THE MECHANICAL FACTOR IN POST-OPERATIVE HEMORRHAGE AND HEPATIC INSUFFICIENCY IN JAUNDICED PATIENTS

JOHN CULLIGAN, M.D.
Saint Paul

THE surgical management of patients suffering from obstructive jaundice has been the subject of numerous discussions and papers during the past ten years. Walters has enumerated the three chief sources of danger in these patients as follows: (1) hemorrhage, (2) uremia, (3) hepatic insufficiency. As a result of his work it is now well established that the coagulation time of the blood in jaundice is increased, and that this can be reduced by intravenous injections of calcium chloride given before operation and that post-operative hemorrhage is thereby diminished. Hepatic insufficiency, although present to a more or less degree in all jaundiced patients, is frequently exacerbated following any surgical procedure and this usually occurs some time in the first ten post-operative days, and it practically always results fatally.



Fig. 1. Cystogram of a patient with complete retention of urine due to prostatic hypertrophy, showing bilateral ureteral reflux due to back pressure.

Although intravenous calcium chloride is a great aid to the safe conduct of jaundiced patients, it is apparently far from being a panacea in the removal of the associated danger. In spite of its use we still have post-operative hemorrhage and we still have exacerbations of hepatic insufficiency. In other words there are other factors present which result in post-operative hemorrhage and hepatic insufficiency.

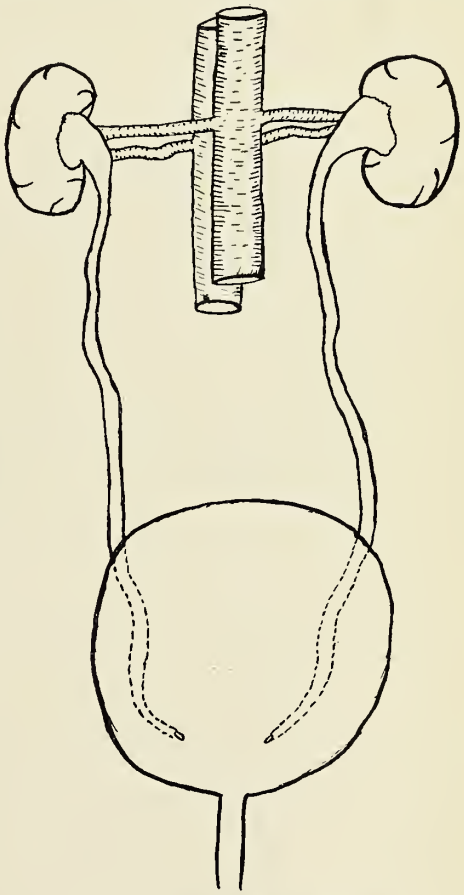


Fig. 2. Schematic sketch of the urinary tract showing distended bladder, ureters, and renal pelves—and the blood supply to the kidneys.

Evarts Graham has lowered the mortality from operations on the biliary system by determining the degree of hepatic insufficiency with the use of various dye retention tests. His work

*Read before the annual meeting of the Minnesota State Medical Association, St. Paul, May 25, 1932.

has established that co-existing liver damage is present even in cases where one would think from clinical examination that no damage could have been done to the liver. He has come to the conclusion that phenotetraiodophthalein is the most reliable dye test and that intravenous injection is the method of choice for cholecystography or for a test of liver function. If over 60 per cent of the dye is retained in the blood stream after one hour, or in other words if the liver is damaged to the point where it cannot eliminate

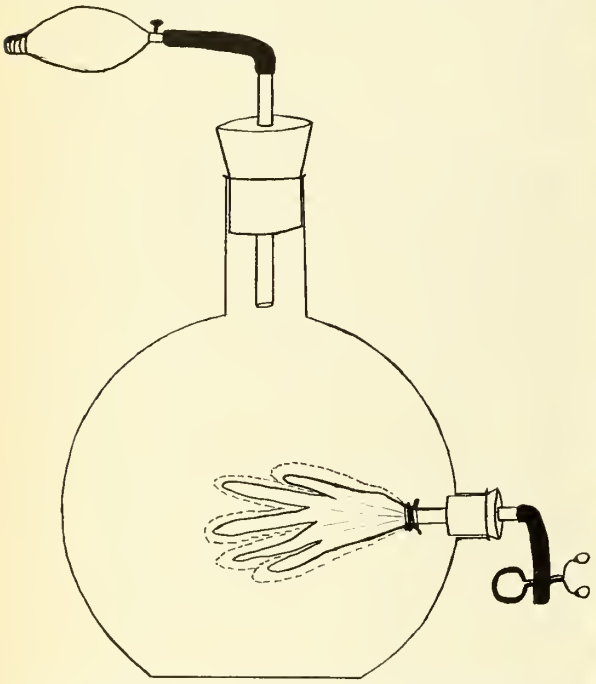


Fig. 3. Sketch of an apparatus showing that changes in pressure of one system can affect the size, shape and pressure of a second system incorporated in the first.

50 or 60 per cent or over in one hour, he believes such patients are poor surgical risks and should be placed on a medical regime until their dye retention is reduced to 30 or 40 per cent. In his hands and in the hands of his co-workers the mortality from surgery on the biliary system has been reduced from over 6 per cent to 0.4 per cent.

However, other surgeons have not been able to approximate his low mortality, particularly in jaundiced patients when hepatic insufficiency is usually the greatest. However, Graham has added immeasurably to the safety of patients who must undergo operations on the biliary system. He attributes the reduction in mortality to the fact that surgeons are now becoming

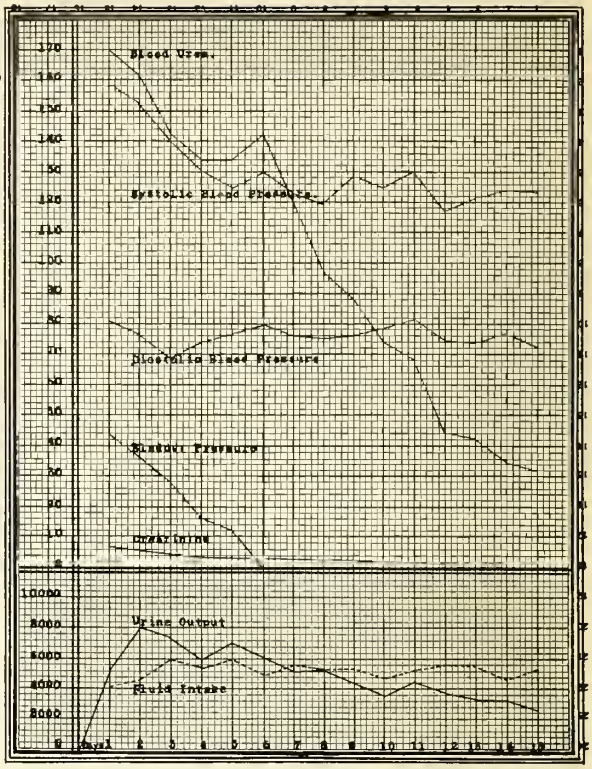


Fig. 4. Chart showing the effect upon the blood urea, creatinine, blood pressure in a patient with urinary retention due to prostatic hypertrophy when the bladder is gradually decompressed successfully.

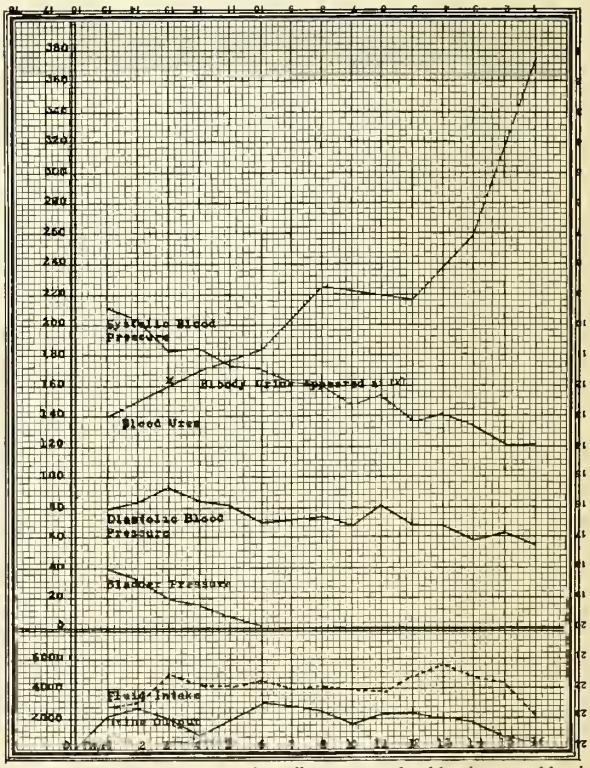


Fig. 5. Chart showing the effect upon the blood urea, blood pressure, and the appearance of hematuria in a patient with urinary retention due to prostatic hypertrophy when the bladder is gradually decompressed unsuccessfully.

"physiologically minded" in approaching their problems.

There is one factor which to my mind has been overlooked in considering a surgical problem of the biliary system and it also is in the realm of physiology in its application to the functioning of the liver. I refer to the disturbances which may result in an organ by the sudden changing of the existing pressure and I shall endeavor to demonstrate the physical action which results when this pressure is suddenly disturbed.



Fig. 6. Normal corrosion preparation of biliary tree (after Counseller and McIndoe).

Fig. 7. Result of intermittent obstruction of the common bile-duct by Stone (after Counseller and McIndoe). Note the extreme dilatation.

Fig. 8. Benign stricture of the common bile-duct (after Counseller and McIndoe). Note the extreme dilatation.

An analogy may be drawn between obstruction in the biliary tract and obstruction in the urinary tract. A patient with prostatic hypertrophy has urinary retention with secondary back pressure on the ureters and kidneys. Sudden release of this pressure by catheter or suprapubic drainage results frequently in hematuria and sometimes in anuria. Van Zwallenburg in 1920 proved that this hematuria was caused by numerous punctate hemorrhages in the renal pelvis. The physiology of this phenomenon may be explained as follows: the kidney has gradually been forced to perform its function against a steadily increasing intra-pelvic pressure (Fig. 1). In order to accomplish this the blood supply to the kidney and the blood pressure increase. A swollen, tense kidney results. Then the bladder is suddenly drained and the intra-pelvic pressure is released. When this occurs the intra-renal capillaries suddenly enlarge because of the increased blood pressure and the decreased intra-pelvic pressure. If their distensibility is not very great they rupture and hemorrhage results (Fig. 2).

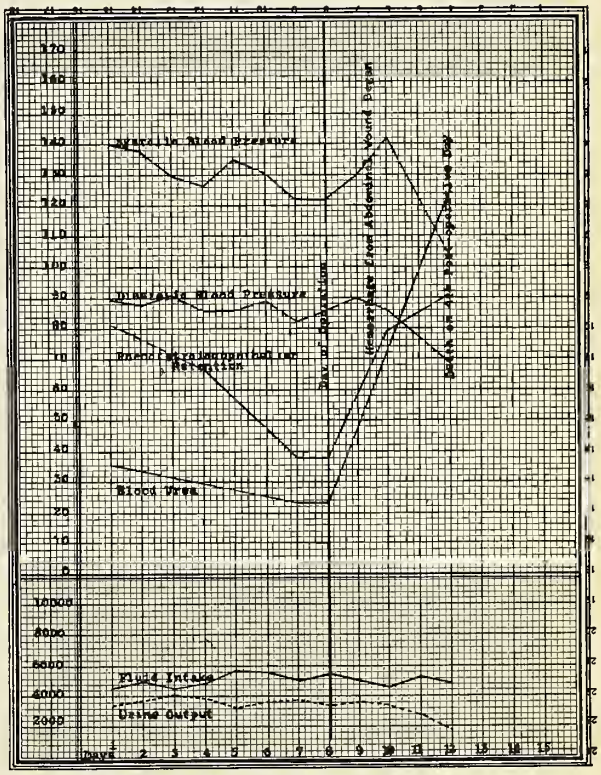


Fig. 9. Chart showing the effect upon the liver function, blood urea and blood pressure and the point of appearance of abdominal hemorrhage in a jaundiced patient after removal of a stone from the common duct and altering the intrabiliary pressure.

That changes in pressure in a closed system will result in changes in pressure in a system incorporated in it, can easily be demonstrated by a simple apparatus (Fig. 3). If we suddenly release the air from the outer compressed air chamber the air in the balloon has less pressure to work against and it suddenly enlarges and assumes the size indicated by the dotted line. Now let us assume that the large container is a kidney with increased intra-pelvic

pressure and that the balloon is its vascular system. If we suddenly release the intra-pelvic pressure, we increase the size of the vascular system. The pressure suddenly is decreased on the and McIndoe beautifully demonstrated this in their celloidin-injected livers after the hepatic tissue had been removed by corrosion. The biliary tree is analogous to the ureters and renal

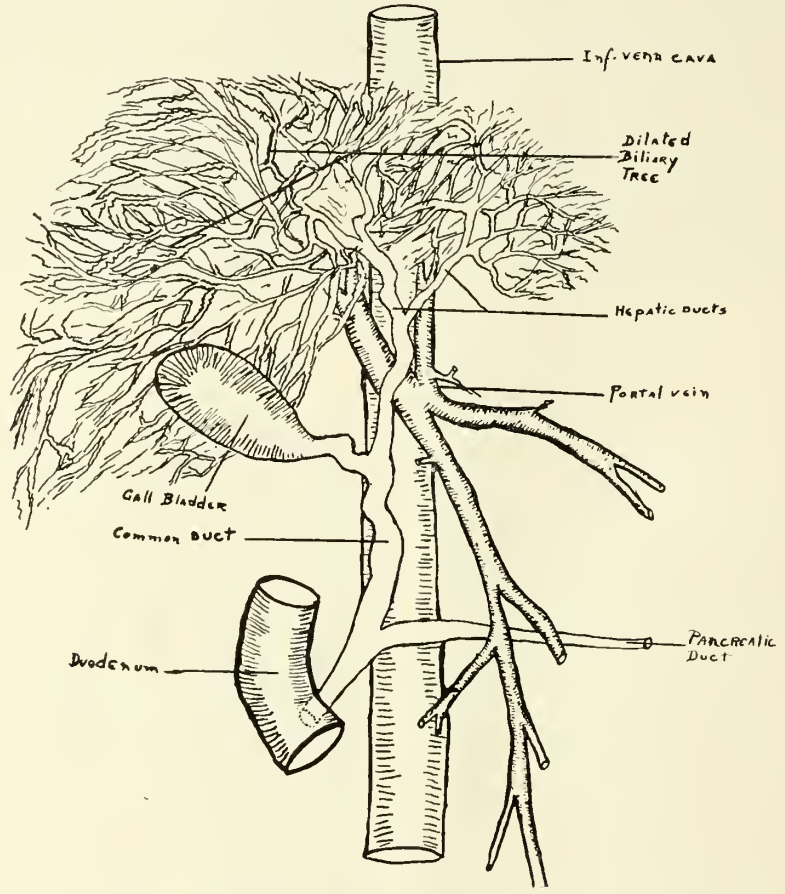


Fig. 10. Schematic sketch of the biliary tree and portal vein showing the interrelationship between the two systems.

outside of the membrane and the balloon (the blood vessels) enlarges. If the distensibility of the blood vessel walls is not sufficient, rupture and hemorrhage results and this engorgement if extreme may result in a total urinary suppression. To combat this, gradual decompression of the urinary tract was advocated by Van Zwallenburg (Figs. 4 and 5).

Somewhat the same condition prevails in the biliary system of patients with obstructive jaundice. Increased intrabiliary pressure is present not only in the gallbladder and in the common and hepatic ducts but it also extends into the biliary tree and is therefore present throughout the entire liver (Figs. 6, 7 and 8). Counseller

pelves; the portal system is analogous to the vascular system in the kidneys.

Just as hemorrhage from the renal pelvis occurs after the release of intra-pelvic pressure, it was argued that rupture of the vessels of the portal system may follow the sudden release of intra-biliary pressure (Fig. 9). Walters has shown that downward displacement of the liver causes a marked disturbance in the portal vascular system which is evident by a marked fall in blood pressure. He accomplished this by inserting a rubber glove between the liver and the diaphragm and distending it with air. If it is possible to obtain a marked disturbance in the blood pressure by merely displacing the liver by

extrahepatic pressure, it should be reasonable to expect a much greater disturbance by a sudden mechanical release in pressure throughout the biliary tree. Reasoning from this premise it seems logical to suggest gradual decompression of the biliary tree in an attempt to give the portal system a chance to adjust itself to the different pressure (Fig. 10).

I regret that I have not a large series of cases to prove my theory has definite clinical value but in offering it for what it is worth I can report that no demonstrable post-operative hemorrhage or hepatic insufficiency resulted since this method was employed, and I offer this in the hope that other surgeons may be prevailed upon to try to decompress the biliary system and thereby supplement my meager data in an effort to determine how much if any clinical value it possesses.

The method is simple and adds no risk to operation on the biliary system. When an incision is made into the distended biliary system, an attempt is made to lose as little bile as possible. I use rubber covered clamps on the hepatic ducts where it is feasible and open the gallbladder or common duct below that point. Then when the obstruction is removed, a clamped tube is inserted for drainage and sutured as snugly as possible in an attempt to prevent any leakage. The rubber covered clamp is then removed. The wound is closed and the patient returned to bed with the tube still clamped. Where it is not feasible to use a rubber covered clamp, we insert the tube into the common duct, losing as little bile as possible. The clamp on the tube is loosened at half hour intervals allowing from six to ten c.c. of bile to escape, and it is then clamped again. This procedure is carried out over a period of four days when the clamp is removed and not reapplied. In this manner the pressure in the dilated biliary tree is not suddenly released, and the liver has an opportunity to readjust itself gradually to its new pressure and no sudden enlargement of the capillaries of the portal system will result which might cause rupture and engorgement. I feel this procedure should be one more factor in reducing post-operative hemorrhage and an increase in hepatic insufficiency.

ANAL FISTULAS*

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THE term "anal fistula" is used to designate a discharging sinus or sinuses, with one or more openings in the anal canal and an opening or openings either on the external surface of the body or in an adjacent viscus, such as the vagina, bladder, urethra, uterus, prostate gland, seminal vesicles, or the bowel itself. The anus is usually the primary seat of the disease, and from the original infection in one or more of the anal crypts, the disease progresses through various stages to the formation of the fistula. It has been customary to refer to the openings of fistulas as internal and external. I would urge that this classification be discarded, and that the terms primary and secondary be used instead. Although the primary opening is always internal, the secondary opening is not always external. The latter usually appears on the external surface of the body in the region of the anus, but often the abscess ruptures into the bowel, bladder, vagina, and so forth, and at such times it would be better to refer to the point of rupture as a secondary opening.

ETIOLOGY

It is advisable to remember that the primary opening will usually be found in an anal crypt because during examination there is a tendency to pass the margin where the crypts are situated, and to look too high for the origin of the disorder. One of the chief reasons for failure to cure anal fistulas is this misconception.

It has usually been taught that the primary cause of anal fistula is an abscess in the ischiorectal tissues. It is true that this abscess is an important part of the process that develops into

*From the Section on Proctology, The Mayo Clinic, Rochester, Minnesota. Read before the Minnesota State Medical Association, St. Paul, May 23 to 25, 1932.

a fistula, but it is by no means the primary cause. When the abscess forms it is often responsible for the chief symptoms which attract the patient's attention to the development of the fistula. Soreness, a sense of fullness, tenderness, or some other sensation of discomfort about the anus or the lower part of the rectum might have been noted, but these are usually too insignificant to cause any impression. The surgeon, therefore, usually has no opportunity to investigate the conditions which are responsible for the development of the fistula until after the abscess appears. It does not seem necessary to regard seriously such unusual causes of ischiorectal abscess or fistula as tuberculosis, actinomycosis, and so forth. Actinomycosis occurs so rarely that it is almost a pathologic curiosity, and it is probable that tuberculosis may be found associated with anal fistulas in about 9 or 10 per cent of cases; even then, however, the associated tuberculous condition can be considered as the cause of the fistula in scarcely more than 2 or 3 per cent of cases. It was once thought that all anal fistulas were caused by tuberculous invasion of the ischiorectal tissue; few now have this idea.

PATHOLOGY

There are four stages in the development of anal fistulas. The first stage begins with involvement of the anal crypts. These little pockets are surrounded by lymphoid tissue, and are formed at the juncture of the skin with the mucous membrane, at the inner margin of the anus. These crypts are susceptible to all traumatic influences which attack the rectal outlet. Anything which produces a break in the tissues about the anal crypts, with subsequent admission of such organisms as colon bacilli, Proteus vulgaris, staphylococci, streptococci, and so forth, may result in infection of these crypts, and from this, in turn, fistulas may develop. The infected crypt becomes edematous, the papilla becomes inflamed and adherent over the crypt, and this point of infection is the beginning of the fistula.

The second stage is a process of burrowing. The infection in the crypt begins to expand, and with its spread it extends into the tissue adjacent to the anus. There are several courses which these tracts may pursue, but most of them burrow either through the substance of the external sphincter muscle, or internal to it, between it and the internal sphincter. It ultimately finds its way into the ischiorectal tissues, where the abscess develops.

The third stage occurs when the ischiorectal abscess develops. After the infection passes through or between the muscles, the irritation produces a spastic condition, and, except in cases in which there is great destruction of muscle fiber, this spasm prevents return flow of the pus toward the anus. Consequently, there is an accumulation external to the muscle and the abscess develops in the loose tissues of the buttocks, the ischiorectal spaces, or the pelvis.

In the fourth stage, the abscess increases in size and may rupture either externally, on the cutaneous surface, or into one or more of the pelvic viscera. With the appearance of the secondary opening, regardless of its situation or manner of development, the fistula is complete. The supposed incomplete, external fistula is an impossibility. Such a condition implies absence of a primary opening, and the very nature of the disease precludes such a possibility. There are times when the surgeon, being unable to find the primary opening, believes that there is none, but this opinion is erroneous. All anal fistulas have primary openings.

Occasionally a tract will burrow from its source under the pectinate line, between the anal muscles, and upward under the rectal wall, forming an abscess which adheres to, and ultimately ruptures into, the rectum. This tract may also extend externally into the buttocks and rupture through the skin. In such a case one is easily misled, because when the probe is inserted into the secondary (external) opening, it may pass through the high rectal sinus; likewise, when methylene blue, barium, or other solutions are injected, the colored material appears in the rectum above the anal crypts. Unless the true origin of the infection is understood, one may make the error of regarding the high sinus as the starting point of the fistula.

Occasionally the virulence of the infection is responsible for excessive destruction of the muscle fibers as the burrowing continues. As a result the muscle spasm may be overcome also, and the pus is able to escape by returning along the tract and is discharged into the anal canal at the portal of entry of the infection. In such a case there is often no rupture externally, and consequently the fistula is not completed. The

result is a blind sinus, the so-called "blind internal fistula."

TREATMENT

The patient usually does not consult a physician until after the abscess has formed, and frequently not until after it has ruptured. If induration without fluctuation is present, hot applications and such measures as are necessary to bring the abscess to a "head" should be used, after which it should be opened. Some patients may be extremely ill with high fever, and it is difficult to decide whether to continue treatment to hasten the process of localization or to operate. Generally the abscess should be allowed to point close under the surface of the skin, if possible. The process may find its way into the pelvis, but it is better to incise through the buttocks than to open the abscess through the wall of the rectum, even if the incision must go through several centimeters of normal tissue. The incision should be made in such a manner as to leave the secondary opening as large, if possible, as the cavity of the abscess. The use of the cautery is rarely necessary for fistulectomy and tuberculous fistulas heal just as readily, even though the cautery is not used. Digital exploration should not be done except with the utmost care. Irrigation of the cavity with solutions should be avoided. Either of these maneuvers may result in destruction of the pyogenic wall of the abscess and systemic reaction may prove serious. It is best to put in an iodoform gauze drain after the operation is completed and do nothing more. Before performing fistulectomy the cavity of the abscess should be permitted to heal until it is reduced in size, and only a chronic fistulous tract remains. If the abscess is small, complete excision, including the anal crypt, may be possible. Usually, however, the abscess should be taken care of first and the fistula later.

Preparation of the patient for operation is essentially the same as that which has been described for other rectal operations. A small retention enema of oil is given the evening before the operation and cleansing enemas are given in the morning. No laxatives or cathartics are used, and the patient is restricted to liquid diet for supper and breakfast before operation. Sacral or caudal anesthesia is preferable because, aside from painlessness, what is most desired is relaxation of the anal sphincter without distortion of the parts, and these types of anesthesia accomplish both. The operation is performed with the patient in the prone position, the pelvis being elevated on a transverse bar attached to the table.

Operation.—The operation is begun by dilating the anus to a diameter of 4 to 5 cm. After examination of the fistulous tracts has been completed, the anus is incompetent due to anesthesia, and remains open after withdrawal of the dilating finger. Then, by simply retracting the buttocks forcibly, the pectinate line can be seen and the crypts explored without difficulty. There may be more than one primary opening, and there may be more than one secondary opening, but there is usually one on the inside which is the source of the infection and is responsible for the fistula. This opening is usually in one of the anal crypts, and when there is another opening in the rectum, it will be found above the pectinate line some place in the wall of the rectum, due to rupture of the abscess at that point. Fistulous tracts follow irregular courses, and there is constant risk of forcing the probe into normal tissue through the angular walls of these tracts if fistulas are probed from the outside toward the bowel. I do not inject colored solutions. It seems unnecessary to use this means of distinguishing the characteristic changes in tissue.

It is easy to discover the primary opening by examination of the crypts themselves. It is possible to judge with fair accuracy where the primary opening will probably be by noting the position of the secondary opening. A simple rule will assist in determining the course of the tract. If one imagines a straight line drawn between the tuberosities of the ischia it will pass across the anus near its anterior margin. If the secondary sinus is anterior to this line, the primary opening will probably be in the anterior half of the anus, and a straight fistulous tract will connect the two openings. If the secondary opening is posterior to this line, the primary opening is usually found in the posterior median line of the anal canal, and the fistulous tract will pass from it in a curved course. If there are multiple openings, and sinuses are found anterior and posterior to this imaginary line, the external sinuses are usually connected by tracts, and the rule for the posterior opening applies. About 50 per cent of the primary openings will be found

in the crypt or crypts situated in the median line of the posterior anal wall; about 20 per cent are in the median line of the anterior anal wall, and about 30 per cent are in the right or left walls. If the anal canal is divided into anterior and posterior halves, approximately 70 per cent of fistulas will be found to have originated in diseased crypts of the posterior half.

There is usually a definite sinus inside which can be seen without difficulty. Frequently pus can be seen coming from behind the pectinate line. Sometimes a tuft of granulation tissue can be seen within a crypt, and occasionally only a little inflammatory reaction, with bleeding on slight trauma, designates the position of the primary opening. Many times surgeons are perplexed because of the apparent absence of a primary opening. When the abscess has formed and ruptured, release of pressure and establishment of a point of discharge make it theoretically possible for the tract extending from the anus to the abscess to heal and become fibrous. The tract may shrink and actually become obliterated. In this way the crypt could close completely. This is probably the explanation of the "incomplete external fistulas" described by surgeons who have been unable to demonstrate a primary opening. When the primary opening is found, one should perform the operation from this point outwardly, cutting through the fibers of the anal sphincters external to the tract, and carrying the incision down through the wall of the fistula. Rarely will it be necessary to begin division of the tract externally, with a probe or a grooved director in the external sinus. All fistulous tracts should be opened throughout their length and all overhanging edges thoroughly cut away. The tracts should be excised unless they extend into the pelvis, or so deeply into the ischiorectal spaces that excision cannot be accomplished without sacrificing too much tissue. When the tracts cannot be excised they may be scarified so that they will heal with a solid scar. If there should be a sinus extending into the pelvis, not communicating with the bowel above the anus, it will probably heal if left alone, provided that the process of infection is interrupted by completely uncovering or excising the tract connected with the anus. Then the infective discharge from the rectum passes outside, and can no longer accumulate in the tunnelled fistula. The source of infective material is isolated from the tract, and the subsidary tract, which was not excised, is allowed to heal. If possible, all fistulas should be opened. If the sinus is connected with an opening high in the rectum the surgeon should cut through the rectal wall, through the entire course of the sinus and leave the wound open. Only superficial tracts should be sutured, and then not so close to the anus that there will be pockets and overhanging edges near the anal margin. It is rarely necessary in treating fistulas to operate in stages, except when there are hidden tracts which cannot be discovered at the first operation. Leaving iodoform gauze or other forms of packing in place too long is often responsible for loss of muscular control. The walls of the wound ultimately become a fibrous membrane beneath the dressing under such circumstances, and a cavernous scar results. The anal sphincters cannot close the rectal outlet by exerting their pull on the margins of such a membranous scar. The scar must be solid. The gauze should be removed early, while the walls of the wound are still raw. The edges will then come together with healing and form a solid block of scar tissue throughout. The anal muscles grow to this scar and will close the outlet of the rectum just as if the muscle fibers were not interrupted.

In cases in which the condition is complicated by tuberculosis, treatment of anal fistulas should be surgical, even if the pulmonary lesion is severe. The patient should be relieved of the additional physical burden by performance of a suitable operation.

PRESENT-DAY SURGICAL TREATMENT OF CARCINOMA OF THE RECTUM AND RECTOSIGMOID*

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THERE is no problem with regard to diagnosis of carcinoma of the rectum since even a cursory digital examination invariably reveals the lesion. Carcinoma of the rectosigmoid, however, because of its anatomic situation occasionally is palpated with difficulty by the examining finger; always it may be recognized by proctoscopic examination.

I would emphasize the difference between carcinoma of the rectum and carcinoma of the rectosigmoid because of the necessity of adopting different measures for their surgical eradication. The rectosigmoid juncture is an annular portion of the intestine corresponding with the anatomic situation at which the peritoneum which lines the abdominal cavity is reflected off the rectum. Surgically, it is proper in reality to consider the last 5 or 6 cm. of the terminal sigmoid, and the upper 5 or 6 cm. of the extraperitoneal rectum as the rectosigmoid. This portion unfortunately is, as the old axiom goes, "too high to get at satisfactorily from below, and too low to get at satisfactorily from above," and yet, actually, it harbors two-thirds of the so-called carcinomas of the rectum.

In an effort to localize accurately growths of the rectum and rectosigmoid, because of the belief that they were not all of a piece but presented different clinical and operative problems, I located the growth in 100 consecutive cases, according to its position in the rectum, at the rectosigmoid, or in the anal canal and found that sixty-seven were in the rectosigmoid, as I have designated its surgical limitations; twenty-one were in the rectum proper, and two were in the anal canal. The significance of such localization is easily understood when it is recognized that the rectosigmoid is a semifixed point; that there is usually a rather sharp angulation as the sigmoid enters the rectum, and that the arrangement of the musculature at this point acts similarly to that of a weak sphincter muscle. The result of these anatomic factors is that with a carcinoma at this point, encroaching as it does on the lumen in an encircling way, obstruction in some form is a predominant symptom. Secondarily, because of the difference in the lymphatic distribution and drainage of this portion of the gastro-intestinal tract, entirely different types of surgical procedures, more radical, it is true, are essential to satisfactory extirpation than those lower in the rectum.

Unquestionably, one of the greatest advances in dealing with carcinoma of the rectum, from a surgical standpoint, has been the recognition of the lymphatic drainage of this portion, as established by Miles, and the application of extensive operative procedures to carcinoma in this situation, dependent on the well-recognized principle of radical extirpation of the offending growth and the glands and gland-bearing tissues in its immediate vicinity. The lymphatic drainage, as Miles has emphasized, which is both intramural and extramural and divides further the zone of upward extension, the zone of lateral extension, and the zone of downward extension, is so different when the growth is high in the rectum, as against that in the anal canal, that indications for surgical procedures differ. For instance, the growths in the anal canal have a tendency to metastasize forward into the groin, whereas those higher metastasize toward the mesentery of the sigmoid and through lymphatic anastomosis involve the nodes in the ischiorectal fossa, in the base of the broad ligaments, and around the base of the prostate gland. That rectal and rectosigmoid carcinomas may be thought of as entirely different in type, both symptomatically and surgically, seems to me necessary.

The diagnosis of carcinoma of the rectum or rectosigmoid revolves around three significant symptoms which, I think, normally are indicative of the growth in its earlier stages, and are, in order of their importance: change in bowel habit, bleeding, and pain. I make this notation of the symptoms of carcinoma in this situation in order

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to point out that carcinoma is usually so easily recognized that it should be recognized here just as easily, and in as early a stage as carcinomas of the breast or of the lip, or if mild symptoms, not pathognomonic, but directed to the point in question, demand a careful examination. Certainly, the 20 per cent of patients who present themselves for treatment of carcinoma of the rectum or rectosigmoid, and who have been operated on for hemorrhoids within the period of their symptoms without recognition of the underlying condition, would argue strongly in favor of more accurate examinations.

Change in bowel habit is not as easily explained as perhaps it should be, since normal bowel habits vary in different persons and it is difficult frequently on direct examination to elicit information on this point. It is not unusual for patients to answer that their bowel habit is normal when, in reality, they are passing three, five or even more stools a day. I believe that an excessive number of stools a day, or alternating periods of constipation and diarrhea, should be considered as abnormal, and call for a rigid examination of the lower part of the alimentary tract.

Bleeding is perhaps the chief complaint of patients suffering from carcinoma of the rectum or rectosigmoid. Forty per cent of the patients with carcinoma of the rectum or rectosigmoid coming to The Mayo Clinic complain of bleeding, and a similar percentage complain of pelvic pain. Bleeding cannot occur until the mucous membrane of the bowel is invaded, nor can the length of time the symptoms have persisted be evaluated accurately because it is indisputable that the growth has been present, in many instances, for a long time without producing symptoms. In my experience the average patient with carcinoma of the rectum or rectosigmoid has been aware of some of the characteristic symptoms for approximately eleven months prior to seeking advice. The sluggishness and the tendency to somnolence of the growth in such cases is significant in prognosis, and the further fact that they are of relatively low or only of average malignancy (according to Broders' grading), lessens their tendency to invade the glands and metastasize distantly and influences prognosis favorably following radical extirpation. Miles has estimated that it requires six months for the carcinoma of average malignancy of the rectum or colon to traverse a fourth the distance around its circumference, and that about the same time is required for lateral extension to affect the mucosa or muscular layers. Blood, when mixed with the stool or on the stool, is perhaps the most constant symptom of disease of the lower part of the bowel or rectum. It certainly is one of the manifestations and, as a premonitory signal, should call for complete examination of the parts. If blood is present for a number of consecutive days or weeks it should be considered as due to a malignant lesion, until it is proved otherwise. Investigation following prolongation of even slight symptoms by proctoscopic or digital examination of the rectum, will direct attention to many of these growths and prevent many of the tragedies which result from procrastination.

All growths of the rectum may be palpated, but growths of the rectosigmoid are not so easily felt. However, if the patient is placed in the knee-chest position, and is required to strain, the growth will usually be pushed down so that the tip of the examining finger may feel its lower edge. If patients are women the growth may often be palpated satisfactorily through the vagina. There are so few lesions which may be confused with carcinoma of the rectum or rectosigmoid that there is little excuse for error in diagnosis. Tuberculosis of the rectum is often spoken of although, as a matter of fact, tuberculosis is one of the rarest lesions observed in the rectum and is easily distinguishable by its local appearance and by distant association with tuberculosis. Syphilis of the rectum need be given small consideration in its distinction from carcinoma, although syphilitic strictures unquestionably occur. Occasionally it is necessary to differentiate chronic ulcerative colitis but this is done both by proctoscopy and roentgenology. The characteristic appearance of the solitary, ulcerating, infiltrating, fixed lesion of the rectum, or the more common polypoid cauliflower-like, pedunculated growth, does not as a rule require biopsy for accurate diagnosis. I believe, however, from the standpoint of prognosis and selection of cases that biopsy should be practiced as a routine. It should be done with a sharp cutting instrument and the wound promptly cauterized. In this manner there is little danger of propagating carcinoma cells to distant organs; it is of prognostic rather than of diagnostic value. I emphasize again that the diagnosis of carcinomas

of the rectum and rectosigmoid should be made by digital and proctoscopic examination. It is such a simple matter for the trained proctologist to view the intraluminal portion of the bowel up to the middle of the sigmoid that I believe all lesions below this point should be diagnosed in this manner. Roentgenologic examination beyond the middle of the sigmoid is invaluable, but the resulting interpretation of lesions of the rectosigmoid and rectum leaves much to be desired.

THE RELATIONSHIP OF POLYPS TO CARCINOMA OF THE RECTUM

To speculate on the possible etiologic factors involved in carcinoma is always intriguing. The accuracy of such speculation is invariably questionable. However, that there is a direct association between polyps, which are so common in the colon and lower part of the rectum, and definite malignant change, is, I believe, indisputable. The accessibility of polyps of the rectum and their recognition in the colon by roentgenologic examination has stimulated their closer study in The Mayo Clinic in recent years with a view to attempting to establish some relationship between benignancy and malignancy in this region. Polyps are eight or more times as common in the colon and rectosigmoid as in the large bowel, and carcinoma occurs in about the same proportion.

Recently, FitzGibbon and I studied a series of cases of carcinoma in which we demonstrated, at least to our own satisfaction, the sequence of events through which a benign polyp passed into malignant adenocarcinoma. This work parallels that of Hauser, Schmiden, Westhaus and Wechselmann, and the criteria by which the gradations were established, likewise were almost identical with theirs; that is, inflammatory polyps were excluded and only the type was included which is normally found in the colon and rectum. These polyps were classified into three groups, according to their structural changes.

In group 1, the epithelium retained its normal characteristics and there was little if any tendency to malignant change. The polyps were small, varying from 1 mm. to 1 or 3 cm. on cross section. Characteristic pedunculations were present even in their smallest caliber.

In group 2, the polyps were easily distinguishable by abrupt and striking structural changes in both the epithelium and in the connective tissue. The epithelium was characterized by widespread failure of the cells to differentiate into normal intestinal mucosa. The hypertrophy and the elongation of these cells, together with their bulk, made them appear to be compressed from side to side, and their arrangement in numerous places digressed from the normal single row into buds which projected both into the lumen and into the connective tissue matrix. The nuclei were likewise elongated and took stains more deeply than is usual, and the amount of nucleus in the cell protoplasm was decidedly diminished. The nuclei developed to a distinct stalk, apparently the result of the pull of the tumor, responding to the peristaltic action. The rapidity of the formation of the stalk influenced the connective tissue elements differently. If the growth was rapid, they spread out into tree-like masses, becoming pedunculated and frequently massive. Occasionally, if the growth was very rapid, they were sessile, and their edges were overhanging. Evidence of inflammation almost invariably was present. In these polyps, unquestionably, malignant changes developed in many instances.

In group 3 the polyps differed from those of group 2 only in that they formed more rapidly, were less pedunculated, and were likely to undergo malignancy of a higher degree. The distinction in groups 2 and 3 is not sharp, as between groups 1 and 2; the rate of development of the polyp, perhaps, is the deciding factor in the grouping of these two. Polyps of group 3 must start in the overgrowth of glandular tubules in the mucosa. They are small, flat and sessile. In development the connective tissue stroma lags behind the epithelial activity and from these polyps come the deep-seated destructive carcinomas of the colon. Although I would not commit myself to the view of certain observers, that every carcinoma of the colon or rectum develops from these preëxisting polyps, I believe that a great many of them do. In the polyps I have studied, in which definite adenocarcinoma was found associated with or dependent on the polyps, I felt that the relationship was indisputable. It is true that a carcinoma may be of the polypoid type without coming from a polyp, as occasionally is seen, but undoubtedly there is a definite association here. As additional evidence of the close relationship of polyps and carcinomas, one need only study a series of cases of polyposis or polypoidosis to be more thoroughly

convinced. In the presence of this entity, in which the formation of polyps is widespread, and there are so many hundreds of them in the colon that little normal mucous membrane remains, it is recognized that about 40 per cent of the patients die from carcinoma. This familial group, perhaps, is one of the soundest arguments in favor of development of carcinoma from polyps and in the presence of polyps, but granting that this is true, the character of the underlying, initiating factor is a moot question.

TREATMENT

The choice of treatment for carcinoma of the rectum and rectosigmoid at the present time is radical extirpation in all cases in which the growth is movable or has not metastasized to other viscera, especially the liver. Radium also has a certain field of usefulness. The selection of cases for irradiation, however, is too uncertain at present to warrant its practice as a routine in operable cases. That better understanding of its utility, either alone or in combination with surgery, will promote better end-results is earnestly to be desired. The radiosensitivity of growths of the rectum and rectosigmoid seems to me to be the crux of the situation and accurate knowledge of this is not available. Radium can be ideally applied to carcinomas of the rectum and to certain carcinomas of the rectosigmoid, and if a firmer knowledge of the radiosensitive growths is established, undoubtedly the end-results will be better. I have the feeling that tumors of high grade malignancy are more radiosensitive than others, and that those of low grade malignancy are distinctly more favorable for surgical extirpation. For epitheliomas of the anus, radium rather than radical operation is employed, but for the treatment of most carcinomas of the rectum and rectosigmoid, I heartily agree with Gordon-Watson, who has treated with radium in the last year more than 200 patients with malignant growths of the rectum. He stated: "I am satisfied that with our present knowledge, the results of treatment are too uncertain to justify the use of radium as a routine measure in preference to radical surgery in those cases in which there is a reasonable prospect of successful radical surgery. It is a tempting proposition to remove an early rectal growth with the aid of radium, to leave an intact rectum with normal function, and to avoid a colostomy. We can attack the tongue in this way and be confident of a cure in a large percentage of cases, but we cannot control or stop lymphatic spread without the aid of surgery in most instances." This seems to me to be a most logical view. I feel strongly that when a patient with a carcinoma in any portion of the alimentary tract applies for treatment, he should be given the benefit of the most radical measures possible for its eradication, whether or not these measures involve a mutilating operation and loss of certain physiologic functions. Since a radical operation on the rectum or rectosigmoid is only possible by sacrifice of the wonderful sphincteric apparatus which nature has contrived, I believe that the greatest single forward step in the treatment of carcinoma in this situation has been the acceptance of permanent colostomy as a preliminary step in radical excision. One greatly desires and is frequently tempted in many cases to make an effort to save the sphincter by a temporizing procedure, but even a cursory examination of one's own statistics three, five or ten years following such operations, will disclose a huge number of recurrences and a small group of living patients, and one will thus be deterred from a very wide application of such principles.

In operating on carcinoma of the rectum, I believe one should have at least four measures at his command: (1) a one-stage combined abdominoperineal resection; (2) a two-stage combined abdominoperineal resection; (3) colostomy and posterior resection, and (4) local excision or segmental excision with preservation of the sphincter, or destruction of the growth by cautery or diathermy, as a palliative measure. Removal of the glands and gland-bearing tissues will be accomplished radically in a high percentage of cases by only the first two types of operations, and yet, in the selection of operative maneuvers, even the boldest surgeon will find that the application of a one-stage combined abdominoperineal resection as a routine measure will greatly reduce his operability statistics. Although in most of these cases in the clinic, colostomy and posterior resection is still performed. I have found it possible to extend the combined abdominoperineal type of operation very widely by making of it a two-stage maneuver. I am convinced that this is the operation of choice when its applicability is feasible.

Operability has such wide range that what may

be considered an operative case by one surgeon may be considered inoperable by another, but I believe that in all cases in which there is no metastasis to the liver and in which the growths are not fixed to adjacent tissues or other viscera, in the absence of extremely grave and debilitating coexisting conditions, patients should be subjected to extirpation, even with the possibility of a relatively high mortality rate. By doing the operation in two stages and prolonging the time between colostomy and resection, the advantages of rehabilitation and decompression are increased materially.

The first stage consists of colostomy and exploration. The latter, I believe, is more satisfactorily made through a low median line incision which permits exploration of the abdomen from above downward; the liver, the nodes along the aorta, and those in the bifurcation of the iliac vessels are explored first and the growth last. It is difficult to overestimate the importance of not handling the infected growth until at the end of the exploration, and then manipulating it as gently as possible to determine its mobility and fixation. The colonic stoma should be made through a small stab wound in the left groin; the single-barreled stoma, which means division of the bowel with inversion of the lower segment and its return to the peritoneal cavity, is the most satisfactory. There are two factors which materially influence the comfort and control of a colonic stoma. One is herniation around the colostomy wound and the other is the prolapse of the mucous membrane. Both of these may be avoided. Herniation is avoided by making a small stab wound. I am convinced that almost invariably hernias follow colonic stomas which are made in the right rectus incision, and not infrequently, in split muscle incisions, if there is pressure from an outside appliance.

The bowel is explored through a low median line incision and is pulled down until a fixed point in the sigmoid is reached; here it is divided and the upper end is pulled out through a small stab wound which is no larger than absolutely necessary to bring the colon through. Sutures are not placed in the colon. It has been my experience that this is the most desirable and satisfactory type of colostomy, and that the patients experience a great degree of comfort.

The second stage of the operation is carried out after four to six weeks, and is as radical as is possible; the segment of bowel, the nodes and node-bearing tissues below the colonic stoma are removed. It has been my practice to mobilize the rectum from behind in this stage, freeing it up to the peritoneal fold, then encasing it in a rubber glove, and dropping it back into the hollow of the sacrum and closing the wound. This is done under sacral anesthesia. Following this the patient is turned on his back, the median line incision is opened again, the ureters are identified on both sides, the inferior mesenteric vessels are ligated, the pelvic peritoneum is incised, and the entire segment of bowel is lifted out through the abdomen. A new diaphragm is made of peritoneum; if the patient is a female, the broad ligaments and uterus may be satisfactorily utilized in the preparation. The wound is closed and drainage is provided posteriorly by removal of some sutures and putting in a small pack to control whatever oozing is present.

My experience with this maneuver has been eminently satisfactory from the standpoint of immediate mortality, and without too closely contracting the horizon of operability it has been possible to operate in a large number of cases with a mortality of between 9 and 10 per cent. The first series of consecutive cases in which I attempted this operation numbered twenty-three before there was an operative death. Although I recognize that this type of maneuver must not be applied as a routine, I believe that with increasing experience and with earlier diagnosis it may be done in perhaps two-thirds or three-fourths of the cases, with a mortality rate of 10 per cent, and without contracting the operability rate, which ranges from 50 to 58 per cent, varying a little in different years.

PROGNOSIS

The outlook for longevity following successful resection of the rectum or rectosigmoid by radical surgical measures is influenced by both extrinsic and intrinsic factors. Extrinsic factors may be grouped under such general terms as physical condition of the patient, and duration of the lesion, and they are modified by such various local conditions as situation, size, mobility, hyalinization, fibrosis and metastasis. Probably the most important governing factor influencing prognosis in carcinoma of the rectum, as well as in other situations, is the intrinsic activity of the carcinomatous cell. Expressed in terms of grading of

malignancy, which recognizes as its basic fundamental the differentiation of cells, one is able to be extremely accurate in the prognostication of longevity of patients suffering from carcinoma.

Broders and I reviewed 598 cases of carcinoma of the rectum and rectosigmoid in which operation was performed in The Mayo Clinic between 1916 and 1926. It was readily apparent that the percentage of cases in which metastasis was present at the time of operation is in direct proportion to the grade of malignancy, and that the reverse was relatively true in the absence of metastasis. Taking the whole group, and counting it a good result if the patient lived over a definite period of years without recurrence or metastasis and died of some other cause, and as a bad result if the patient died from carcinoma, whether or not the recurrence was shortly after the resection, it was found that in the whole series, the influence of metastasis was indicated by the following: 20 per cent good results and 79 per cent total poor results when metastasis was present at operation and 57.8 per cent good results, and 42 per cent total poor results when metastasis was absent at operation. The conclusion is obvious from these figures that if a carcinoma of moderate grade may be radically extirpated, more than half of the patients with such growths have a chance of survival over a relatively long period. The added factor that growth in this situation is slow and metastasizes late increases the hopeful prognosis enormously, and one is encouraged to be optimistic as to future treatment.

During the last year in The Mayo Clinic, the radical operation of combined abdominoperineal resection, in one or two stages, was done in fifty-one cases, as against sixty-four posterior resections and nine anterior resections, showing a shift toward the more radical type of maneuver. By holding the mortality at or below 10 per cent, and with an operability of 55 per cent, it is anticipated that a higher percentage of satisfactory end-results will be secured in such cases. It is highly desirable that both the medical profession and the laity become more "colon conscious" in order that the initial symptoms of carcinoma of the rectum and colon may be more readily recognized and treated. It is obvious that the end-results following operation will be in direct proportion to the promptness with which advice is sought and the proper measures are instituted.

THE SEX HORMONES*

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THE always interesting field of endocrinology has been made even more interesting in recent years by the research efforts of some very able anatomists, physiologists and biochemists of our own and other countries.

We shall first discuss the hormones which affect the female genitalia, under the head of the body fluid or body tissue, from which they are derived. Then an effort will be made to indicate, as far as our present knowledge goes, the practical use to which they may be put.

The Ovaries.—Until comparatively recently only one hormone was supposed to be secreted by the ovary. Now we have evidence that at least six hormones are derived from this source. The most important two are known by various names. One, of follicular origin, has been called female sex hormone, folliculin, oestrin and theelin; the other, derived from the corpus luteum, is known as progestin or corporin.

Of the names given to the follicular hormone, theelin is probably now in most general use in this country. This hormone may be extracted not only from mature ovarian follicles, but from ovarian stroma, young corpora lutea, the human placenta, as well as the placentæ of the horse, sheep and cow. It has also been found in the umbilical cord, the amniotic fluid and the blood and urine of pregnant women. Progestin or corporin, while probably secreted only by the corpus luteum, may also be found in human blood and urine during pregnancy, as well as in the placenta.

The function of theelin is to cause growth and

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development of the fallopian tubes, the uterus and the vagina. In animals it also brings about a change in these organs, known as oestrous, which is evidenced by canalization of the vagina and cornification of its epithelial surface. In the monkey theelin alone cannot cause menstruation. It can develop the endometrium only to the interval stage.

The action of progestin is threefold:

(a) It supplements the action of theelin on the endometrium, causing development to the premenstrual or pregravid condition.

(b) It sensitizes the uterus for the reception of the fertilized ovum.

(c) It maintains pregnancy to the end of the first and probably to the end of the third month.

As clinicians we are particularly concerned with the effect of theelin and progestin when administered to the human subject. Will theelin, for example, develop the pubescent genitalia of the human female, or correct the menstrual irregularities resulting therefrom? It most probably will not, in the amount in which it can be administered. The unit of theelin is known as the rat unit, or the mouse unit. This is the amount of theelin which, when injected subcutaneously in the immature or the spayed rat or mouse, will cause cornification of the vaginal epithelium. Marrian and Parkes (1) have shown that 200 M. U. are necessary to produce typical estrous changes in the uterus of the mouse. The human patient weighs 2,000 times as much as the mouse. Therefore, in order to produce an effect on the human uterus similar to that produced by theelin on the uterus of the mouse, 400,000 M. U. are necessary. Now 1 mg. of theelin contains about 1,000 M.U. Therefore, 400 mg. would be necessary to bring the endometrium of the human uterus to the interval condition. The chief source of theelin is the urine of pregnant women. One gallon of urine yields from 0.5 mg. to 1.0 mg. of theelin. Therefore, at least 400 gallons of urine would be necessary to cause minimal histological changes in the uterus of one woman. Of course the ovaries are usually functioning to some degree and theelin is necessary only to supplement their activity. But even in such cases a much greater quantity of theelin is necessary than is generally supposed.

There are some who contend that the physiological action of a homone is not necessarily in proportion to the amount administered, and in support of this theory they claim to have obtained good results in the human subject by the use of theelin as a nasal spray, nasal jelly or vaginal suppository. I have not been able to find, in the literature, any experimental work which supports or refutes this theory as it applies to theelin; but it has been definitely shown by Brambell and Parkes[2] that if the concentration of the ovulation-producing hormone in the circulation of the rabbit after copulation is reduced by 40 per cent or more, ovulation is inhibited, and there is no scientific reason for believing that the action of theelin may not also be roughly proportional to the quantity administered. Even if a sufficient quantity of theelin were available for administration, it would not cause menstruation. To develop the endometrium to the premenstrual or pregravid condition, progestin or corporin is necessary, and this hormone has not yet been prepared in a form suitable for injection into humans.

The Anterior Hypophysis.—Most of our knowledge concerning the activity of the sex principles of the anterior hypophysis has been only recently acquired. Some workers, prominent among whom is Van Dyke,[3] believe that only one principle is secreted; while others, such as Zondek and Aschheim,[4] Hisaw,[5] Claus,[6] and Wiesner,[7] have produced considerable evidence in favor of two hormones.

The activating principle or principles extracted from the anterior hypophysis have been variously named by the different workers. Zondek and Ascheim have named them Prolan A and Prolan B, Wiesner Rho 1 and Rho 2; while Van Dyke, assuming the existence of only one principle, has given it the name hebin.

Prolan A and Rho 1 are the names given to the hormone which causes maturation of the primordial follicle, while Prolan B and Rho 2 are different names for the leutinizing hormone. These two hormones are supposed to be supplementary to each other; that is, Prolan A will first mature the primordial to a Graffian follicle and then Prolan B will cause leutinization of this follicle. Experimentally, ovulation seldom occurs during this process unless anterior hypophyseal implants are used. The Gonad-stimulating principle is found in the blood, urine, decidua and placenta of human pregnant females, but it is not found in the urine, decidua or placenta of pregnant animals, with the single exception of

the mare in the middle third of pregnancy. Unlike theelin, it is not found regularly in amniotic fluid. It is not found in cerebrospinal fluid during pregnancy, nor in the blood and urine of normal persons, except occasionally in infants.

Prolan A is very unstable. It is destroyed by boiling for a minute or being allowed to stand for a relatively short time. Both A and B are destroyed by the digestive enzymes and are, therefore, ineffective when given by mouth.

Prolan B is now available in a very concentrated form and has been administered, intramuscularly, in certain conditions with good results.

Placenta.—From the placenta, Collip[8] has separated two gonad-stimulating principles—emmēnin and A-P-L (anterior pituitary-like substance). It is doubtful if any female sex hormone at present available, with the single exception of emmēnin, is effective in humans by the oral route. The unit of emmēnin is the minimum amount which when administered in small doses to immature rats, over a period of three days, results in the appearance of estrous in from three to five days. Emmēnin is of value, chiefly in dysmenorrhea, and possibly in hemicrania.

A-P-L is administered subcutaneously. The day unit is defined as for emmēnin. Its effect on the ovaries is that of follicular maturation with normal ovulation and corpus luteum formation. It is of value in quite a few gynecological conditions, as I shall later indicate. A-P-L can also be obtained from the urine of pregnant women.

The placenta has been found to contain both theelin and progestin, but it probably acts only as a storehouse for these two hormones.

Our knowledge concerning the hormones described has already found many practical applications, very important among which are the various biological tests for pregnancy. Some of these I shall describe:

(a) *Ascheim-Zondek Test:*

The presence of ovary-stimulating hormone in the urine of pregnant women led Ascheim and Zondek to suggest the injection of a few c.c. of urine from a pregnant woman into immature mice as a test for pregnancy. The details of the test are as follows:

1. Five mice are injected with 0.3 c.c. urine, subcutaneously, twice a day for three days.
2. Weight of mice 6-8 grams; age 3-5 weeks.
3. The mice are autopsied at 100 hours after the first injection.

The effect on the mice is as follows:

1. Ripening of the follicles.
2. Hemorrhage into the mature, partly leutinized follicles.
3. Leutinization of the follicles with the formation of corpora lutea atretica.
4. Enlargement of the ovary.

The first and fourth reactions are suggestive of pregnancy; the second and third are diagnostic and usually can be determined macroscopically by naked eye inspection, or by the hand lens. Should there be any doubt regarding the reaction, the ovaries must be fixed and sections cut for microscopic study.

The urine used for the test should be a morning specimen to which is added a preservative (0.2 per cent metacresol is effective) if it is not to be used for some time. It should then be kept on ice until it is ready to be used or forwarded. Before being injected it is made slightly acid to litmus and filtered, if cloudy.

A positive test indicates the presence of living tissue derived from a fertilized ovum. It is positive in intrauterine and extrauterine pregnancy. hydatid mole and chorionepithelioma as long as the ovum or any of its elements are alive and proliferating. The reaction is positive from about a week after the period is missed until the end of the first week postpartum. The test is not entirely specific. While, if the patient is pregnant, the test will be positive in 98 per cent of cases, it is occasionally positive when the patient is not pregnant. The conditions likely to give a positive reaction in the non-pregnant woman are severe endocrine disorders, carcinoma, menopause, and probably bilateral ovariectomy.

The source of the Gonad-stimulating principle found in pregnant urine is not definitely known, but the weight of evidence does not favor the anterior pituitary.

(b) *The Friedman Test:*

Friedman[10] found that the adult rabbit could be used because of the fact that it ovulates only after copulation. Four c.c. of suspected urine is injected intravenously, three times a day for two days. Forty-eight hours after the first injection, the rabbit is anesthetized and the abdomen is

opened. If corpora lutea or corpora hemorrhagica are found, the reaction is positive.

(c) *The Reinhart-Scott Modification of the Friedman Test*[11]*:*

Five to fifteen c.c. of urine is given intravenously as a single injection. At the end of twenty-four hours the ovaries are examined and are usually found to be positive at that time if the patient is pregnant. If they are negative, 5 c.c. more of urine is injected and the ovaries re-examined through the same incision, twenty-four hours later.

(d) *The Brown Test:*

Recently, T. K. Brown,[12] and S. D. Soule,[13] of St. Louis, have injected the rabbit, intravenously, with the blood serum instead of the urine of pregnant women. The effect of the serum on the ovary was found to be the same as that of the urine.

Approximately 10 c.c. of whole blood are obtained from the patient and the serum removed. The serum is allowed to stand for at least four hours before injection, as fresh serum is toxic and may cause death. The average amount of serum was found to be 1 c.c. per 600 or 700 grams of body weight of the animal. Rabbits weighing from 1,500 to 1,600 grams gave the most constant result. Two false reactions are reported in a total of 350 tests.

In addition to the various tests for pregnancy, there are certain diseases where our knowledge of the sex hormones is proving to be of some value.

Distrophia Adiposo-Genitalis of Fröhlich.—The patient with this disease has obesity, pubescent genitalia and low metabolism. The cause of the metabolic changes is probably not in the pituitary gland itself, but in the hypothalmic region contiguous to the gland. Many physicians are treating this condition with theelin, anterior pituitary extract and thyroid extract. Potent pituitary extracts are now available. Of anterior-pituitary-like substances at present obtainable, Collip's A-P-L has greatest promise of value. Theelin, in amounts administered, has probably no effect. Thyroid extract supplies the deficiency in thyroid secretion, due possibly to the absence of the thyroid activating hormone from the pituitary or the infundibulum.

Functional Uterine Bleeding.—In this condition the histological findings are an absence of corpora lutea from the ovaries with persistence of unruptured Graffian follicles. The endometrium shows hyperplasia with occasional and irregular bleeding. The primary cause of this disturbance is dysfunction of the pituitary. In the ovary there is a persistent excess of theelin with little, if any, progestin. The treatment would therefore seem to be either progestin itself or anterior-pituitary-like hormones which would stimulate the ovary to the production of corpora lutea. Progestin is as yet unsuitable for administration to humans. Prolan B, such as Parke Davis Antuitrin S, has been given with success. Collip (14) has reported good results from his A-P-L in forty of these cases. In the simple type of menorrhagia, treatment for one week before the period is expected, materially reduces the flow. Menorrhagia, of the severer type, may require treatment for three months, or longer, before normal periods are established. Metrorrhagia is not so easily controlled as menorrhagia. The duration of treatment may be considerably shortened in cases where gentle curettement has been recently performed. When the uterine bleeding is secondary to pelvic infections, tumors, or large ovarian cysts, endocrin therapy is probably valueless.

Dysmenorrhea.—When this is primary, Collip reports excellent results from the oral administration of 5 c.c. doses of emmēnin t.i.d. before meals for seven to seventeen days before the onset of the period. Ninety per cent of Collip's cases were cured, or markedly relieved. If dysmenorrhea is secondary to pelvic infection, fibroids or large ovarian cysts, hormone therapy is probably of no therapeutic value.

Oligomenorrhea.—If the patient started to menstruate at a normal age and menstruated normally for some time but, later, menstruation became scanty and irregular, oral administration of emmēnin in 5 c.c. doses t.i.d. has yielded very good results. The longer the interval between menstrual periods, the fewer the number of cases that respond to this treatment.

At the University Hospital we have just succeeded, with A-P-L, in establishing normal painless menses in an unmarried nullipara of 21, who for about five years after onset of catamenia had normal periods but later developed dysmenorrhea and oligomenorrhea with frequent lapses. Other similar cases are now undergoing treatment.

If the patient has failed to menstruate for some years after the normal time for onset of

catamenia, little can be expected from endocrine therapy except possibly relief from headaches, and this is especially true if bimanual examination reveals a rudimentary uterus.

Menopause.—To relieve the symptoms of the menopause, A-P-L and probably emmēnin should, theoretically, be of value.

Sterility.—If this is due to pubescent genitalia, with occasional and scanty menstruation, A-P-L may establish normal periods and thus increase the chances of pregnancy.

Frigidity.—In most cases this condition is either psychic or due to rudimentary genitalia. In the latter case, nothing can be expected from hormone therapy, while in the former case, it can act only as a psychotherapeutic agent.

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SOME PRACTICAL ASPECTS OF ALLERGY*

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ALTHOUGH the phenomenon of allergy has been observed for many years, its general and practical application in medicine is recent. Specific sensitivity has been observed since the beginning of medicine, and usually was termed idiosyncrasy. The reactions described consisted of violent gastro-intestinal disturbances due to certain foods, bronchial asthma because of contact with air-borne substances, and various acute manifestations of the skin. Schloss, in 1912, was the real pioneer in this subject, and developed the scratch tests for foods; it is only in the last fifteen or twenty years that these methods have been in general use.

The exact nature and fundamentals of allergy are not known, just as the fundamentals of immunity are not known. Von Pirquet originally defined allergy to include immunity, but a distinction is now made between the two. The fact that the practical application of allergy is com-

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paratively recent, together with this lack of definite knowledge as to its real nature, has created various degrees of opinion and enthusiasm regarding it. This reflects itself in the literature and has been confusing to the physician who has not made a special study of the subject; in fact, there is much difference of opinion among the men who have made allergy a specialty. Because of these existing variations of opinion it requires a good deal of courage to discuss allergy. In reviewing the literature I have noted more than fifty distinct syndromes which have been attributed to allergy and there seems to be no limit to the symptoms and diseases that are ascribed to it. These vary from the most minor conditions such as constipation and slight irritation of the bowels to the more serious disturbances, such as bronchial asthma and epilepsy. Whether a patient should be subjected to an extensive and expensive investigation for allergy should depend on the severity of the complaint and the amount of disability. It is obviously impossible to investigate all cases in which these various symptoms are presented, many of which are extremely mild. In Table I, I have attempted to group the manifestations for the purpose of making a practical working basis.

TABLE I. ALLERGIC MANIFESTATIONS

Respiratory	Gastro-intestinal
Vasomotor rhinitis	Diarrhea
Hay fever	Vomiting
Asthma	Colic
Cutaneous	Mucous colitis
Angioneurotic edema	
Urticaria	
Eczema	
Dermatitis	

We might add to this list of allergic manifestations many other conditions such as migraine, epilepsy, arthritis, irritation of the bladder, and so forth, but because of existing differences of opinion I have included only the more commonly accepted conditions.

Skin tests are being extensively used in an effort to determine the specific stimuli causing allergic reaction. It is not possible for the internist who sees only an occasional patient with suspected allergy to keep on hand a large stock of protein extracts for skin tests. If the foods, pollen, animal danders, and so forth, are included the number of preparations would run into the hundreds. It is possible, however, to keep on hand a few of the more common pollens and animal danders. Thus, a patient who lives on a farm may be tested with the dander of the animals with which he comes in contact or, if a patient's complaint is seasonal, he may be tested to the pollen of plants in his particular vicinity. In asthma and hay fever it frequently is possible to alleviate the patient's malady by having him avoid contact with these offenders, or in some instances to obtain successful desensitization.

Opinions are divided as to the value of skin tests to foods. I believe that most physicians engaged in allergic work have the feeling that the results are rather unreliable. It is a common experience to obtain negative skin reactions to food of patients who are clinically sensitive to that food. Conversely, many patients will give positive skin reactions to foods, the ingestion of which produces no symptoms. It is also interesting to note that a patient may give a positive skin reaction on one occasion and a negative reaction on another. The presence of a positive or negative skin reaction to foods is, therefore, not evidence that these foods are or are not offenders. In estimating the value of skin tests in the diagnosis of allergy, the present consensus of opinion seems to be that fair reliance may be placed on the results obtained by air-borne or inhalant substances, whereas the value of these tests to bacteria and ingested proteins has not been established.

TABLE II. SUBSTANCES TO WHICH PATIENTS ARE EXPOSED

Inhalants	Direct contact
Pollens	Drugs
Animal emanations	Plants
Dusts	Chemicals
Vegetable powders	Clothing
Molds	Infection
Ingested substances	Sinuses, and so forth
Foods	
Drugs	

In the absence of facilities for skin tests, there are other practical methods which assist in the determination of specific sensitization. The data obtained by skin tests must be corroborated by contact or elimination of contact with the excitant in position. In conjunction with the anatomic classification in Table I, one must keep in mind the substances which are most likely to

produce allergic manifestations. Since patients are exposed to offending substances by inhalation, ingestion and direct contact, these substances have been grouped in Table II, according to the usual method of contact.

Bronchial asthma and hay fever are the most significant clinical manifestations of the inhalant group, vasomotor rhinitis usually causing less discomfort. It is in this group that the skin tests are most reliable, but without them much valuable information may be gained. The pollens present the least difficulty since the patient's symptoms occur only in certain seasons. These may be roughly divided into three periods, the spring season due to the pollination of trees, the early summer season due to the common grasses which pollinate from early June to the middle of July, and the autumn season during which the weeds pollinate from early in August to frost. There are a few miscellaneous and domestic plants which may cause trouble at any time during the growing season. The patient may be relieved by avoiding contact with the offending pollen by means of changing location, or perhaps by preseasonal desensitization.

It is necessary to study every detail of the patient's home life and occupation to determine possible allergic factors in nonseasonal asthma and vasomotor rhinitis. The patient's contact with dust or molds found in grain dust, buckwheat and wheat in the process of milling, orris root face powders and other vegetable powders, must all be considered as possible factors. The question of bedding and upholstered furniture is important because of the cotton, feathers, kapok or animal hair used in their manufacture.

Whether symptoms are due to an inhalant may be determined by placing the patient in a dust-free room. There are various commercial air filters which make it possible for a room to be closed entirely to offending substances in outside air. A fairly efficient dust-free room may be constructed in the home with an electric fan, and an improvised air filter made of cotton batting placed in the window.

Allergic manifestations due to foods present a difficult problem. When urticaria, angioneurotic edema, bronchial asthma, or gastro-intestinal manifestations are of the acute type with abrupt onset and intense symptoms soon after the ingestion of food, it usually is easy for both the patient and his physician to determine the offending substance. However, in the chronic skin manifestations and in many mild and vague gastro-intestinal symptoms which have been attributed to food allergy, it is infrequent that a specific sensitization to food can be demonstrated. The unreliability of skin tests to foods has been mentioned. Elimination diets are extensively used at present, but they should not be used indiscriminately. Often the removal of a certain food is coincident with, but not the cause of the patient's improvement. It is not unusual to see patients who have eliminated many articles of food from their diet with resulting loss of weight and malnutrition and who, in some instances, have a definite food neurosis. It seems more practical to place the patient on limited but adequate diet and to add, one by one, the suspected articles of food and note the results. It may be necessary to repeat this process several times with certain foods to eliminate the element of coincidence.

The question not only of foods but of preparation of foods is important, as patients sensitive to cottonseed may obtain reaction from cottonseed cooking oils or salad dressings. At The Mayo Clinic recently I saw a patient who had urticaria when she had eaten only certain brands of canned fish, and it was discovered that these brands were canned in cottonseed oil.

Drugs usually present little difficulty, as in this instance the patient's reaction is likely to be severe and sudden with the ingestion or application of the drug.

In allergic skin disorders direct contact is equally significant or perhaps more so than the question of ingested proteins, and this again entails a detailed study of the patient's routine. Patch tests are valuable in determining these contacts and consist in placing the suspected article in contact with the skin and leaving it there for a few hours. A control patch of some other material should be used.

I have attempted to outline some practical methods of approaching the diagnosis of the specific excitant in allergic disease. In spite of prolonged and detailed study, we are confronted with the fact that, with the exception of pollens and animal danders, the specific excitant is not discovered in the majority of cases. One has only to recall the many failures in chronic asthma and urticaria to appreciate the truth of this statement. The allergic patient has inherited or ac-

quired a predisposition to allergic reaction. In some instances, this allergic state is constant and the patient has a reaction whenever he is exposed to his offending allergens. This usually constitutes the case of sudden onset and intense symptoms. We have learned, however, that there are many nonspecific excitants which will precipitate an attack in subjects so predisposed. This probably is because a certain degree of tolerance exists to the exciting factors and the nonspecific excitants overcome this tolerance and produce the allergic state. In fact, it is not always necessary that the specific excitant be present, as is shown by the fact that emotional upsets may produce a reaction. Because of the difficulty and uncertainty of fixing the responsibility on a specific allergen, a study of the nonspecific factors is often the physician's only means of attack in the treatment of his patient. Maytum has likened the allergic patient to a loaded shotgun with several triggers, any one of which is capable of precipitating an allergic explosion. These triggers may be specific or nonspecific excitants, the latter including infection, local irritation to the skin, respiratory or gastro-intestinal tract, malnutrition, and general lowered resistance. Probably most significant among the nonspecific excitants is fatigue, nervous exhaustion or emotional upsets and general physical debility.

I shall choose asthma as an example of illustrating this feature. Given a patient suffering with prolonged asthma, in whom, after a detailed search for the specific cause, we are unable to find the offending allergen. The patient has lost weight, is in a state of exhaustion from loss of sleep and, in most instances, has become fearsome and apprehensive. His loss of weight in many instances is due to the fact that he has been so advised or on his own initiative he has followed an elimination diet to the extent that he has been deprived of sufficient nourishment to keep in good general condition. He may have nasal polyps and some sinus infection. However, many of the nasal conditions seen in bronchial asthma are secondary results and not primarily the cause. Although we believe in clearing up existing infections in the sinuses, a good rule to follow is to do nothing to the nose for the asthma that should not be done for the sake of the nose itself. Adherence to this rule would eliminate many unnecessary operations so often employed in the treatment of asthma. When we begin the examination of this patient, we impress on him the fact that we probably will not find the specific protein responsible, although such sensitivity may be present. We explain to him the mechanism of bronchial constriction and alleviate his fears by assuring him that he has not the fatal type of asthma such as is seen in cases complicated by lesions of the kidney and heart. He is informed that he is an allergic individual, and that at any time that he is subjected to a specific or nonspecific excitant, he may have bronchial constriction. Every effort is made to improve the patient's nutritional condition and to remove his apprehension. By instilling such assurance and confidence and improving the general condition we very often are able to change the patient from his allergic state to a state of tolerance sufficient to improve his asthma. When it is understood that we cannot promise a complete and permanent cure by any one procedure, but that the treatment is designed to correct a variety of causes in an effort to change a condition from continuous to occasional asthma, it is surprising how many invalids can be transformed into useful citizens.

I wish to emphasize the difficulty in demonstrating specific excitants in allergic disease and that, when they are demonstrated, their removal does not always prevent an allergic patient from having allergic reactions from other causes. Under these conditions, a careful study of the nonspecific excitants and education of the patient are often the means of bringing him relief. In other words, rational practice of medicine combined with allergic study will produce better results than investigation from the allergic standpoint alone.

THE SCIATIC SYNDROME*

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THIS is not an attempt to present something new, but rather an effort to gather together our present knowledge concerning the causes and the rational treatment of a very old yet extremely common and important condition.

About 1750, Cotunio described pain in the lower part of the back, with pain in the lower limbs, as a clinical entity, "sciatica." Since that time the term sciatica has been used to describe a great variety of clinical conditions presenting a certain symptom-complex, the common factor of which is pain in the lower back with pain along the course of the greater sciatic nerve, or the latter alone. Following the views of Grossman and Keschner,[1] I would suggest that this symptom-complex be referred to as the sciatic syndrome, since it is not a true clinical entity.

Just what symptoms and findings may compose this syndrome? The sensory part of the complex is characterized by the basic symptom, pain in the lumbar region, with pain along the course of the greater sciatic nerve, or pain in the sciatic distribution alone. This pain is almost always unilateral—may be acute, subacute or even chronic, mild or severe, and may or may not be intensified by pressure along the course of the nerve or by straight leg raising (Lasègue's sign). The other subjective sensory disturbances are of the nature of paresthesias over the lateral aspect of the leg and dorsum of the foot. Objective evidences of disturbance of superficial sensibility are not commonly found but when present they are usually in the form of diminished sensibility (occasionally hyperesthesia) over the same areas to which the subjective complaints are referred.

The motor portion of the syndrome involves muscular tonicity, atrophy, disturbance of reflexes, and the position assumed by the patient in motion and at rest. Some degree of loss of muscle tone is a common finding, but atrophy is seldom marked or even moderate unless the underlying difficulty is a true neuritis or an effect secondary to gross pressure upon the component parts of the nerve, such as may occur with a pelvic neoplasm. The Achilles reflex is absent in from one-third to one-half of all cases. This reflex may disappear early and may never return even though complete recovery takes place otherwise. The knee-jerk may be exaggerated due to hypotonia of the muscle of the posterior aspect of the thigh. In those few cases in which the second or third lumbar spinal nerves are involved as well as the spinal nerves forming the sciatic nerve, there may be absence of the knee-jerk. When the patient is at rest in the standing position, a scoliosis of the lumbar spine, with many times an associated flattening of this portion of the vertebral column, is frequently seen. This list may be toward or away from the affected side or may even alternate. The contralateral type is by far the most common. Muscle spasm along the lumbar spine is a frequent finding. In less severe and more recent cases this abnormal curve disappears on lying down. The affected limb may be drawn up on reclining, if the pain is severe. In walking, there is a limping gait which favors the affected side.

In addition to these sensory and motor symptoms and findings, there may be sympathetic disturbances such as dry scaly skin and coldness of the affected extremity. Occasionally edema and gross trophic disorders may be seen.

It is self-evident that all of these symptoms and findings can never be present in any one case. I wish to again emphasize the point that pain along the course of the greater sciatic nerve, with or without associated lumbar pain, is the one constant factor in the syndrome.

I will now offer a classification of the chief varieties of the sciatic syndrome, making the distinctions upon the basis of etiology in so far as practicable, briefly characterizing each type and leaving the consideration of their treatment until later. In this discussion we shall consider: (1) the sciatic syndrome secondary to general disease or gross pressure; (2) true sciatic neuritis; (3) the sciatic syndrome due to myositis or fibro-myositis; (4) the sciatic syndrome due to neurodocitis.

Before anyone can classify a case presenting

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this symptom-complex a very careful history must be taken, followed in turn by a thorough physical examination, which includes, in addition to a general physical examination, rectal, pelvic and neurological examinations. Many times X-ray films of the teeth, sinuses, gallbladder and alimentary canal must be taken. Almost every case requires roentgenograms of the pelvis and lower spine. Laboratory investigation of the blood and urine should be instituted. Finally each lead found must be thoroughly followed through.

It is well known that this syndrome may be secondary to general disease or gross pressure, but this fact is often entirely overlooked or considered very lightly. Such an attitude is, of course, not warranted and result in glaring errors. This symptom-complex may occasionally be a part of such general diseases as syphilis, diabetes, lead-poisoning and alcoholism. Tumors and true inflammations such as tuberculosis of the vertebræ or of the pelvic bones, tumors of the pelvic organs or rectum and tumors of the cauda equina[2] may produce such symptoms. Osteo-arthritis of the hip joint is a cause often overlooked.[3,4] Certain symptoms and findings, when present, aid in placing a case in this group. They are: bilateral pain or pain in the perineum, groin, abdominal wall or anterior aspect of the thigh, in addition to the sciatic pain; deformities of the spine other than the scoliosis described above; marked muscular wasting or paralysis; any disturbance of sphincter control or sexual power, and any severe sympathetic symptoms such as edema or gross trophic changes.

True sciatic neuritis, although very rare, does occur. The common causes are exposure to cold and wind, infection following direct injury, and foci of infection. The condition is really a perineuritis. As Riley has said, a true neuritis should show loss of muscle power, atrophy, decrease or loss of reflexes and alterations or reductions in sensory perceptions. Pain, or at least tenderness of the nerve trunks on palpation, especially at the sacro-sciatic notch and where the nerve enters the thigh, is almost always noted. Pain in the area of the affected nerve may also be present.

There still remains a large group of cases which were formerly considered "idiopathic" or "essential sciatica," the causes of which were not made manifest until recently. A survey of the literature shows a wide variation in opinion as to the relative frequency of these two etiologic factors, but it is safe to say that between them they account for at least 80 to 85 per cent of all cases presenting the sciatic syndrome. These factors are myositis or fibro-myositis and neurodocitis.

Certain investigators, notable among them Riley,[5] Titus[6] and Casamajor,[7] have reached the conclusion that in the vast majority of instances pain in the lower back, radiating down the course of the sciatic nerve, is due primarily to a myositis or fibro-myositis, which may be acute, subacute or chronic. Of course, this inflammation, if it is an inflammation (and a small amount of laboratory work has shown indication that this is true), is secondary to something else. The underlying causes are said to be trauma, irritation, and, in the chronic cases in particular, foci of infection. Those foci most frequently noted are the sinuses, tonsils, teeth, prostate and gastro-intestinal tract. In addition to our ever-present basic symptom of pain we have the following picture which I have quoted directly from Riley: "On examination certain simple physical symptoms can be elicited. In the first place, no evidence of involvement of the central or peripheral nervous systems can be elicited. Definite, localized, more or less acute tenderness to direct or deep palpation over the muscle mass itself is always present, and in favorable instances it is possible to find areas of apparent infiltration in the muscle tissue which may be so numerous as to give the impression of rubbing the thumb over a corrugated washing-board. The effect on the muscle itself of the presence of this inflammatory focus is to produce a localized or generalized spasm in the lumbar region, which may actually produce a tortipelvis and an apparent shortening of one limb." This myositic or fibro-myositic condition may be found in striated muscles anywhere, but its favorite location is in the lumbar and gluteal muscles. It is the same type of process which produces "brachial neuritis."

There remains to be considered, then, neurodocitis. This term, introduced by Sicard, is taken to indicate pain due to stimulation of a nerve by the bony foramen or canal which contains it. Putti[8] has said that the sciatic syndrome, except when due to a true neuritis, or when secondary to gross pressure or definite general disease, is symptomatic of vertebral arthritis, *i.e.*,

"It is caused by pathological conditions of the intervertebral foramina and especially of the intervertebral articulations." In other words, it is a symptom of neurodocitis. This is not a conclusion born of a short period of speculation but represents the results of many years of study by Putti and other noted investigators. The first work of importance of this nature was introduced by Goldthwait,[9] who called attention to certain anomalies of the vertebral column, such as sacralization of the fifth lumbar vertebra and variations in the posterior articulations, and suggested their connection with sciatic pain. This indeed is one of the causes of neurodocitis, but not the most frequent cause.

In order to understand Putti's statement, quoted above, we shall have to review briefly the anatomy of the sciatic nerve, in part, and that of the vertebral foramina, as brought out by Goldthwait, and more particularly by Danforth and Wilson.[10]

The greater sciatic nerve takes origin from a part of the anterior branch of the fourth lumbar nerve, plus the anterior branches of the fifth lumbar and the first, second and third sacral nerves. Since the gluteal nerves have essentially the same origin it is seen that the fifth lumbar nerve supplies fibres to all the muscles of the buttocks, of the posterior aspect of the thigh, of the leg and of the foot. There are a few minor exceptions to this statement. The cutaneous distribution of the fifth lumbar nerve is generally acknowledged as including the lateral aspect of the leg. Then, too, one should recall that within the bundles of efferent motor fibres derived from the fifth lumbar nerve and supplying the muscles referred to there are afferent pain fibres returning from those muscles. Considering the above listed anatomical facts, it can be seen how encroachment upon the fifth lumbar nerve could give rise to the variety of the sciatic syndrome now under discussion.

Investigators have further shown that the intervertebral foramen, through which the fifth lumbar spinal nerve passes, is smaller than any of the corresponding foramina above—the fourth lumbar foramen being definitely larger and each succeeding foramen becoming still larger. Moreover, the nerves that pass through these openings vary inversely with the size of the foramina—*i.e.*, the fifth lumbar nerve is the largest and the fourth somewhat smaller. It is to be noted that the boundaries of the intervertebral foramina are as follows: superiorly there is the inferior intervertebral notch; anteriorly is a little of the posterior part of the vertebral body above, a little of the intervertebral disc and a little of the posterior part of the body below; inferiorly there is the superior intervertebral notch; while posteriorly is found the posterior articulation, a factor of much importance in regard to the production of the sciatic syndrome. Some authorities, among them Cox,[11] feel that sacro-iliac subluxation may cause sciatic symptoms by mechanical irritation of the lumbo-sacral cord, because in entering the pelvis it passes over the upper part of the sacro-iliac joint, where it is closely bound to the anterior ligaments of the joint—the nature of the passage of this cord amounting to a continuation of its bony canal, making it the longest of the canals which are traversed by the component parts of the sciatic nerve.[12]

Considering these anatomical facts, it may readily be understood how anomalies, particularly those of the posterior articulations and that of "lumbar-sacralization" and arthritis involving the intervertebral foramina (frequently seen in the posterior articulations) may cause neurodocitis.

The value of accurate X-rays cannot be overemphasized. Putti[8] says: "Perfect radiograms and experienced examiners are indispensable." Lateral views are necessary as well as anteroposterior plates. It is impossible to obtain a proper impression of the articular facets without stereoscopic films and the lateral views are required to properly judge the proportions and conditions of the intervertebral canals. X-ray may show anomalies of articular tropism, signs of arthritis about the articular facets or their anklosis partial or complete. The sacro-iliac and lumbo-sacral joints may show subluxation. Arthritis of the bodies of the vertebræ is of little importance as a causative factor of this symptom complex. Here, again, we are faced with the problem of finding the cause behind the arthritis involving the intervertebral foramina. Trauma must play a large rôle and most certainly foci of infection are of very great importance. Osgood[13] emphasizes the importance of absorption of toxic substances elaborated in the large bowel associated with intestinal stasis as a causative factor of arthritis in the lumbo-sacral spine.

The clinical phenomena exhibited in addition

to the basic pain are pain on straight leg raising, absence of the ankle-jerk in many instances, slight muscle atrophy and sometimes sensory disturbances. Rigidity of the lumbar spine, with lumbar muscle spasm and a scoliosis in the lumbar portion of the vertebral column are characteristically present. Only the matter of scoliosis needs further comment here. The contralateral type is by far the most common and it results in the spreading of the articular surface of the intervertebral joints on the painful side and also widens the intervertebral canals. The homolateral scoliosis relaxes the joints and the spinal nerves on the affected side. In those cases in which the alternating list occurs, the arthritis is said to be bilateral and the reversal of the abnormal curve is felt to be necessary for rest of these painful articulations.

This factor of scoliosis is a strong support to the theory that the most important factor in the etiology of neurodocitis in this region, and hence the sciatic syndrome of this variety, is localized arthritis of the joints between the fourth and fifth lumbar vertebræ. The finding by Labat and Greene[14] of involvement of the second and third lumbar nerves in some cases further supports the neurodocitic theory.

When the matter of treatment is considered, it becomes evident why emphasis has been placed upon the fact that the sciatic syndrome may be caused by a variety of conditions. Obviously, considering it as a clinical entity has led to utter confusion concerning its therapy. One cannot expect the same results from injection of the nerve proper when the difficulty lies in an arthritis of the lumbar intervertebral foramina with secondary nerve involvement, that one will receive from the same treatment when the causative factor is a true neuritis. Again, physiotherapy to the gluteal and lumbar muscles will not relieve a condition caused by a tumor of the cauda equina. Rational treatment demands a thorough investigation of the individual case, followed by its classification under one of the above headings if possible and logical treatment of the causative factor whenever at all practicable.

The thought probably arises, "That is unquestionably the scientifically proper attitude toward the problem, but it is not practical." It is true that many of these patients are suffering from severe acute pain and present the picture of abject misery, that investigation of these cases often requires a considerable period of time and that something must be done to afford relief from pain without delay. Therefore, we will first outline a plan for the immediate handling of sciatic pain, to be used in those cases where such relief is imperative, pending the detailed investigation which must follow.

Rest in bed, heat and analgesic drugs may be sufficient to allay the pain. If such procedures do not suffice, recourse to sacral epidural injection should be had. This consists of the injection of from 60 to 100 c.c. of sterile normal saline into the sacral epidural space. The technic is a simple one. The patient is placed upon the affected side, with the thighs and legs somewhat flexed. The hiatus sacralis is then located about five centimeters above the tip of the coccyx. At this point, slightly to either side of the midline, the cornua of the sacrum can be felt. Under strict asepsis and with preliminary skin infiltration, if desired, either a Labat spinal needle or an ordinary spinal puncture needle is inserted at this point, at an angle of about 45 degrees, and a small amount of novocain injected. This is continued until the needle can be felt to impinge upon the bone (the sacrum) when it is depressed about 15 degrees and then further advanced two or three centimeters. It usually enters the canal without difficulty and care must be taken not to puncture the dura. When the needle is felt to be in the canal, suction is made with a syringe, to see if the subarachnoid space has been entered. If this has occurred, spinal fluid will enter the syringe, in which case the needle must be withdrawn a short distance and several minutes allowed to elapse before applying suction again. Once being assured that the needle is truly in the epidural space, the sterile solution at body temperature is slowly injected by means of a 20 c.c. syringe. The patient should remain quietly on the affected side for about forty-five minutes, following the injection, and should remain in bed for twenty-four hours or longer. Usually a feeling of distress or pain in the sacral region occurs, particularly toward the end of the injection. Many times a severe pain of short duration is noted in the affected limb. Where quantities larger than 100 c.c. have been used, paresthesias are reported. Very temporary loss of sphincter control sometimes occurs. Evans[15] has reported a case where a severe reaction in the form of

"cyanosis, opisthotonos, unconsciousness and incontinence of urine and feces" followed the injection of 120 c.c. of 2 per cent novocain. The patient regained consciousness within half an hour and made a complete recovery. Almost invariably the symptoms concomitant with the injection are not at all serious and their duration is usually only fifteen to twenty minutes.

The mechanism by which this injection acts is said to be a mechanical stretching of the component nerve roots of the sciatic nerve. Evans[15] presents some good experimental work to prove this contention. Daspit[16] and Ott[17] also claim a very high percentage of cases which receive immediate relief from this form of therapy. The injection may be repeated every forty-eight hours, for three or four times, without ill effect, if this is necessary or desired. This is a simple procedure which is readily available to any general practitioner anywhere.

Another very satisfactory method of securing immediate relief of pain has recently been described by Labat and Greene. The treatment consists of individual blocking paravertebrally of the nerves involved, by injection of weak solutions of alcohol and neocaine. The affected nerves were singled out by means of the "electric percussion hammer"—a small electric vibrator which transmits its vibrations deeply, causing pain whenever the vibrations make or break contact with a diseased nerve or branch of a diseased nerve. Tracings were made along the painful areas and by their anatomical distribution the involved nerves could be determined. The solution injected did not exceed "5 c.c. of 95 per cent alcohol in any individual in no greater concentration than 33 per cent in 1 per cent neocaine solution." During the injection, when the solution reached the desired point, paresthesia of a burning type occurred over the distribution of the injected nerve, which feeling was replaced early by a sensation of warmth and swelling. Remote sensory manifestations after blocking were rather marked in some cases, burning feeling followed by pins and needles sensations being the most common, and were sometimes quite prolonged. Success of the injection could be checked by the "electric percussion hammer." Splendid results are claimed for this treatment, which has just recently been introduced, but it requires a much greater degree of technical skill and demands absolute accuracy in eliciting the nerves involved.

Although permanent relief has been reported in many cases following these procedures, mere relief of pain should not distract the physician from seeking the underlying cause of the disability, nor from proceeding with more rational treatment whenever possible.

If thorough investigation shows the sciatic syndrome to be secondary to a general disease such as syphilis, diabetes or lead poisoning, obviously treatment must be aimed at the primary causative factor in each individual case. Sacral epidural injection may be of great value in obtaining comfort for the patient while specific therapy is under way. In those instances due to tumor of the pelvic organs, of the cauda equina, et cetera, *i.e.*, lesions which exert gross pressure on the sciatic nerve or its constituent parts, the underlying cause should be dealt with surgically where feasible. In those cases of malignancy no longer amenable to eradicative procedures, caudal injection is again the method of choice. Repeated injections at intervals, as required, may be carried out and the use of a sterile non-absorbable or relatively non-absorbable medium, such as liquid petrolatum or iodized oil, has been tried in these cases a number of times with favorable results. By these procedures, the individual may be kept quite comfortable even over periods of many months.

The principles governing the treatment of neuritis elsewhere dictate the care of sciatic neuritis, namely, rest, heat and the relief of pain. In the case of sciatic neuritis, this means rest in bed, preferably with the affected limb wrapped in sheet wool. Diathermy from the lumbo-sacral region to the toes gives a moderate heat throughout the course of the nerve, and along with galvanism is of value in moderately severe and acute cases. In chronic cases, injection of 50 to 100 c.c. of sterile normal saline following immediately a preliminary injection of 2 c.c. of two per cent novocain within the nerve sheath gives a good result in most cases. Injection may be made either at the level of the ischial tuberosity or in the middle of the buttock, where the nerve has just left the sacro-sciatic notch. At the latter point, the nerve is more difficult to locate, but if most of the pain is gluteal the injection should be done at that point.

The technic is as follows[18]: The patient is placed, face downward, on the table, and the site for injection chosen. A small area of the over-

lying skin is then anesthetized and a rather large needle about four inches in length is inserted vertically through the anesthetized area, until the nerve sheath is reached. On reaching the sheath, either it will be felt with the needle or the patient will complain of pain, or both. When one feels he is within the sheath, about 1 c.c. of saline is injected. If the saline is within the nerve sheath the patient will feel a "thrill" pass down to the calf or heel. When satisfied that the point of the needle is within the sheath, 2 c.c. of the novocain solution are injected and when the pain has stopped and the leg feels "dead" or numb, 50 to 100 c.c. of warm sterile saline are introduced. The patient should be kept in bed twenty-four to forty-eight hours. This procedure may be repeated in five or six days if desired. If not successful with the injection at the higher level, sacral epidural injection should be used.

Attention must be called to the necessity of removing foci of infection except during an acute attack. We must remember the gastro-intestinal tract as a possible focus in these cases.

In those instances where this symptom complex is felt to be due to myositis or fibromyositis, physical therapy is the choice. We must not lose sight of the fact that in the subacute and chronic cases of this type the most likely underlying basis is focal infection, and all foci of infection must be adequately treated. Titus[6] has reported the results of observations in over 600 cases which he feels belong in this group. If the case is an acute one, treatment is commenced with radiant light for the purpose of inducing an hyperemia. When this object has been attained, static breeze is employed, and, as improvement occurs, static wave and sparks are used finally. In subacute and chronic instances, diathermy through the pelvis in the region of the sacro-sciatic notch is employed, followed again by the use of the static electricity. Sinusoidal current may be substituted for static electricity if the latter is not available. Deep heat is thus secured, plus the decongesting and muscle stimulating effect of static electricity. Diathermy to the entire course of the nerve and galvanism, as well, are useless here. Massage also is of little value.

Gratifying results are claimed following a few treatments in acute cases, and very satisfactory improvement has occurred in the chronic type. While static electricity is rightfully given great credit in these cases, the importance of treatment of foci of infection, particularly in the cases of longer standing, must not be overlooked.

In those instances where one feels that the sciatic syndrome has been produced by a neurodocitis due either to arthritis of the intervertebral foramina or to the less common cause, sprain and subluxation of the sacro-iliac or lumbo-sacral joints, the guiding principle is immobilization.

In milder and more recent cases, rest in bed, physiotherapy and analgesics, with immobilization by adhesive plaster strapping may suffice. In the more severe and less recent cases, more extensive procedures may be required.

Putti[8] prefers a method which brings about complete immobilization gradually and uses heat as an adjunct. He gives a hot air bath at 90 to 125 degrees for one-half hour daily, to produce an hyperemia. As soon as the pain will allow the patient to stand without great discomfort, immobilization is secured by a plaster-jacket, which gives fixation to the pelvis and trunk, except the shoulders. He emphasizes the fact that this jacket must immobilize only and not attempt to correct the scoliosis present. The cast is left on the first day only long enough for the plaster to dry, is then bivalved and removed. It is worn for an increasing period of time each day, until in about ten days it can be worn by the patient continuously. After two to three months it may be replaced by a corset, which is worn up to a year.

Immobilization may be secured by following a different plan of procedure which is well described by Kleinberg,[19] who, however, feels that sprains of the sacro-iliac and lumbo-sacral joints are more common causes of the sciatic syndrome than is arthritis of the intervertebral foramina. Certainly the method is of equal value whether one attributes the symptoms to the joint strain or to a neurodocitis resulting, if it does, from such a strain. This form of therapy should be restricted to those chronic resistant cases with "fixed" scoliosis. It is designed to break up all adhesions between the lumbar muscles and between the lumbar vertebral articulations, and to immediately correct the deformity as well as to secure immobilization. Briefly, it consists of manipulation, under anesthesia, of the lumbar spine from side to side, followed by hyperextension of the lower limbs until the flatness of the lumbar portion of the vertebral column referred

to above is replaced by the normal concavity. A spica cast, which includes the painful limb, then is applied, thus securing immobilization of the spine and affected limb. In some cases, before applying the cast and following manipulation of the spine, Kleinberg uses forceful stretching of the sciatic nerve, by forcefully flexing the affected lower extremity (with the knee extended), until the leg can be brought to within fifteen inches of the face. This particular portion of the treatment is in general not held in high repute and for the most part has been discarded. It involves, of course, the danger of causing traumatic rupture of the sciatic nerve.

The cast is left on for three weeks, at the end of which time it is temporarily removed, and the patient measured for a Knight spinal brace. Physiotherapy, in the form of heat, gentle massage and graduated exercises of the extremity and back muscles is then begun, and in ten to fourteen days, with brace applied, the patient is able to begin walking. With continued physiotherapy, the individual is said to be able to return to his work about six weeks after he begins to walk.

Excellent results are claimed for this form of therapy. It is particularly suited for chronic cases, due to neurodocitis, for it affords immobilization of the inflamed and subluxed joints in their normal position, and the physiotherapy aids in the absorption of inflammatory products.

Whichever of these methods may be chosen to combat the joint conditions per se, foci of infection whenever present must be adequately treated.

SUMMARY AND CONCLUSIONS

1. The symptom-complex generally called sciatica is not a clinical entity and should be referred to as the sciatic syndrome.

2. Classified on an etiologic basis, four chief varieties of this syndrome are discussed:

(a) That variety secondary to general disease or gross pressure.

(b) True sciatic neuritis.

(c) That variety due to myositis or fibromyositis.

(d) That type due to neurodocitis.

3. Rational treatment demands thorough study of each case, accurate classification, if possible, and logical treatment of the causative factor whenever practicable.

4. Methods for immediate handling of sciatic pain pending investigation are outlined.

5. The most satisfactory therapy for each of these four varieties of the sciatic syndrome is presented.

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UNSUSPECTED LUES REVEALED BY THE ROUTINE WASSERMANN TEST*

CHARLES R. DRAKE, M.D.
Minneapolis

IN October, 1931, a routine Wassermann was done on all cases admitted to the Swedish Hospital, Minneapolis, on medical, surgical and obstetrical cases. Tonsil cases were not included in this work. Practically all specimens were taken the day following admission. This work was done with the hearty coöperation of the hospital staff and of the patients themselves. The patients were almost unanimous in being glad to have a "blood test" but were not told the nature of the test.

The following report covers the work done for the months of November, December, 1931, and January and February, 1932, one-third of a year. It has been found that the results varied considerably for each month. During these four months 1,113 routine Wassermanns were performed, of which sixteen were positive. These positives were all strongly positive, all being four plus with the exception of three which were three plus. The positive cases were all rechecked and a second test performed confirming the results in all cases. The tests were performed with two antigens, plain alcoholic and cholesterinized. They were equally positive in both.

The positives varied each month from 3 per cent in December to 1 per cent in February, with an average of 1.5 per cent for the series.

All of these positives were cases of unsuspected syphilis, were evidently chronic infections which had never been treated and were coincident with the various medical or surgical conditions for which the patients were admitted to the hospital.

The admittance diagnosis in the positive cases were as follows:

Case

1. Carcinoma of Bladder (confirmed by autopsy).
2. Toxic Thyroid (operated); Pleural Effusion.
3. Fibroid Uterus (operated).
4. Carcinoma of Uterus (confirmed by biopsy).
5. Eczema (extensive).
6. Double Vagina (operated).
7. Fracture of Hip.
8. Fracture of Tibia.
9. Incomplete Abortion (curettage).
10. Accident (fracture).
11. Acute Appendicitis (child ten years, operated).
12. Sub-acute Appendicitis (operated).
13. Hernia (operated).
14. Ovarian Cyst; Appendix (operated).
15. Abdominal Ascites, Cardiac.
16. Nervousness (acute attack of indefinite symptoms).

In all of these cases the presence of syphilis was entirely unsuspected. Upon further questioning, a few of the patients gave suspicious histories, but many did not.

This is but a preliminary report and a larger series of cases is desired in order to ascertain the true percentage of infections, but it is interesting to note the relatively high percentage of positives in this rather select series of cases in a private hospital.

It is of further interest to note that so far there have been no positive reactions among the maternity patients, which quite clearly proves the fallacy of pregnancy being a cause for false positives.

It would also be of much interest if the study were carried out on all tonsil cases, especially in adults, for I have seen several instances where tonsils were removed only to find later that treatment for syphilis was the proper indication.

Again practically all of the above patients were apparently normal except for the various diagnoses for which they were brought into the hospital, illustrating the fact that syphilis, especially chronic syphilis, often presents no general symptoms, or its symptoms are masked by other conditions.

In carefully performed and checked Wassermann tests there is no need for questioning the correctness of a positive reaction, especially with a plain alcoholic antigen, and there is no danger of any coincidental disease producing a false positive. All questionable reactions such as a possible one plus were rejected and called negative. It is in the latter cases that highly sensitized antigens may produce false positives and false diagnosis.

*Read before the Hennepin County Medical Society, Minneapolis, April 6, 1932.

THE COMBINATION OF AMYTAL WITH EPHEDRINE IN THE TREATMENT OF ASTHMA*

MELVIN W. BINGER, M.D.
Rochester, Minnesota

DURING the last year a great deal of attention has been called, by other writers, to the efficacy of administering amytal (isoamylethylbarbituric acid) together with ephedrine to relieve attacks of bronchial asthma. Frequently, patients when taking ephedrine alone have complained of nervousness, palpitation, and a shaky, trembling sensation similar to the sensations following administration of the epinephrine hypodermically. It was with the hope of eliminating these sensations that amytal was suggested in combination with ephedrine. The results, after several months' study, are the basis of this report.

At first, amytal, ¾ grain (0.05 gm.), was given with ephedrine, ⅜ grain (0.025 gm.) by mouth, but later changed to amytal, 1½ grains (0.097 gm.), with ephedrine, ⅜ grain. We feel that it is safer to give first ¾ grain of amytal with ⅜ grain of ephedrine, and if no untoward effects of amytal are noted, to increase the dose to 1½ grains of amytal and ⅜ grain of ephedrine. The combination seems especially efficacious in those cases of asthma with a highly nervous background, and in which patients are troubled with attacks of asthma at night. We have had patients who, when first seen, had not had a good night's rest for weeks because of nightly attacks of asthma, and who were, as a result, fatigued, nervous, and apprehensive. This type of patient usually responds well to the combination of drugs, and is grateful for the relief which it affords. We give amytal and ephedrine to those who, by clinical history and cutaneous tests, are specifically sensitive to foreign proteins, and also to those in whose cases we can determine no allergy but the neurogenic factor seems to predominate.

We also prescribe, as a rule, Ochsner's antiasthmatic mixture to be taken in doses of 1 fluid drachm (4 c.c., 1 teaspoonful) four or five times a day for two weeks or longer. This has the combined effect of expectorant and antispasmodic. Administration of the remedies is explained to the patient as being purely for symptomatic relief and not as an attempt to cure his asthma.

Ninety-one questionnaires were sent to patients treated in this way, and answers were received from fifty-nine. Of these, thirty-one felt that they had had definite relief from the combined use of ephedrine and amytal, and many expressed positive opinions regarding the effect that amytal played in relieving the symptoms of nervousness, shakiness and sleeplessness produced by ephedrine alone. Some stated that the combination acted more quickly and relieved the attacks of asthma more completely than ephedrine alone, and others stated that the relief thus obtained was of longer duration. Eleven patients reported that they had noted little or no benefit from the combined drugs, and three stated that they felt worse from taking amytal and ephedrine. Fourteen answers were too indefinite to classify, or the patients had not taken either the ephedrine alone or ephedrine and amytal together long enough to warrant any conclusion.

All in all, the reports were encouraging, and we feel that the combination of a sedative such as amytal with ephedrine relieves the unpleasant reaction of the latter remedy and at the same time enchances the effect by adding a sedative action on the nervous system.

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Submitted for publication, September 8, 1932.

The hospitals throughout the state are having their share, and possibly more than their share, of difficulties incident to the present unparalleled depression. Hospitals on the whole must have their beds possibly three-quarters filled in order to break even financially.

There is no question but that the average so-called private hospital in Minnesota, as elsewhere, is not meeting expenses. On the other hand the free hospitals are receiving increasing demands. Even the private hospitals have increased opportunities for free service. Some have even had to go so far as to furnish the bare necessities of life to some of the graduates of their nursing schools. Deficits have to be met by Boards of Trustees at a time when even they feel poor. The situation is not pleasant to dwell on.

Physicians are sometimes unmindful of the importance of the hospital to them in their vocation. For the most part, bearing no financial responsibilities in the running of the hospital, it becomes easy for the physician to take the hospital for granted. On the whole, however, physicians coöperate with the hospital management and are only too willing to render free medical service to members of the hospital personnel, appreciating the non-profit character of such institutions. The hospitals can count on the continued coöperation of the medical profession.

It is in this spirit of coöperation that special emphasis is given in this number of MINNESOTA MEDICINE to various hospitals throughout the state. The following information has been received in response to our invitation to hospitals in the state to submit news for publication. We trust it will be of interest to our readers.

ASBURY HOSPITAL

MINNEAPOLIS

During the summer and fall months a number of alterations were made in the Asbury hospital building whereby additional conveniences were provided for both patients and doctors. Operating room space was increased and a Westinghouse urological X-ray table was installed. An additional staff room was also provided in connection with the operating rooms.

The officers for 1933 are as follows: Staff President, Dr. R. R. Cranmer; vice president, Dr. H. F. Wiese; secretary-treasurer, Dr. A. E. Cardle; Medical Advisory Board, Dr. W. W. Moir, Dr. C. C. Kennedy, Dr. A. H. Parks, and Dr. Paul Giessler.

LYDIA A. MILLER, *Superintendent.*

BETHESDA HOSPITAL

SAINT PAUL

The new Bethesda Hospital is located on one of the highest promontories in the city of Saint Paul at Como Avenue and Capitol Boulevard, two blocks north of the Minnesota State Capitol. The exterior of the building is in keeping with the times. The prime theory that governed the design of the building was the functions of the building. Much sunlight is needed in a hospital. This necessitated the use of larger windows and this in turn dictated the simplicity of treatment. The bulk of the building is in light buff brick with a much darker brick used in the spanerals, giving a vertical treatment. The entrance feature is made of Kasota stone with the entrance doors and vestibule of highly polished aluminum. The balance of the hospital is trimmed in stone.

The main lobby is two stories high and is treated in a very simple and dignified manner. The woodwork in the main lobby is of natural gum wood, finished without any stain whatsoever except a colorless clear lacquer for the protection of the wood, thereby maintaining and revealing the natural beauties inherent in the wood. Over the door leading into the main wing has been carved this inscription, "God is our refuge and strength, a very present help in trouble." The floor is done in terrazza. Italian imported marble is used for the wainscoting to the height of four feet. The ceiling is adorned in the center by one huge lighting fixture which has been especially designed for this room and carries out the simplicity of this room, at the same time adding a great deal of richness. The lighting fixture is made of nickled silver with imported amber tinted glass and projects down from the ceiling with numerous plate glass disks encircling the hanger. The room has been beautifully furnished with comfortable furniture, not in a stereotyped manner found in most hospital lobbies. Here in this lobby will be found comfortable davenports with end tables, reading lamps, and so on, just as would be found at home.

The hospital is so arranged that sometimes during the day sunshine comes into every room. The patients' rooms consist of a number of deluxe rooms, a much larger proportion of single rooms, two-bed and four-bed wards. There is room for 150 patients. Each room is planned with complete facilities for taking care of the patients, each room having in addition to its bedroom, its own private toilet and lavatory.

The thought of planning these rooms so complete was a twofold one. First, the comfort of the patient. Each patient's room is well lighted and ventilated and has for its night lighting a most modern ceiling facility and the latest type of night lighting. Each room is equipped with radio and telephone plugs in addition to the nurses' signal. Second, the convenience for the nurse. The private rooms were planned with private toilet facilities because of the easing up of the labor of the attending nurse.

The main kitchen is located in the basement and also the nurses' cafeteria, the help's dining room and staff dining room. The kitchen is located in the basement in order to facilitate the serving of food to the various dining rooms. The main floors for the patients are all served from this kitchen and are served by the use of heated food carts.

The first to fifth floor, inclusive, are patient's floors. The second floor is the obstetrical department, with the delivery rooms on the north end, there being two de-

livery rooms, with complete sterilizing and nurses' work rooms between them. This section is also equipped with sound proof labor room and a doctors' shower and rest room. The nursery has complete facilities for preparing babies' food and taking care of the other wants of the infants.



BETHESDA HOSPITAL—SAINT PAUL



THE CHILDREN'S HOSPITAL—SAINT PAUL

The sixth floor is devoted entirely to operating rooms, laboratory and X-ray departments. The operating rooms occupy a little more than half of this floor, with the X-ray and laboratory occupying the remainder of the space. The operating section is equipped with four major operating rooms and two minor operating rooms. All of the major operating rooms are equipped with the latest devices and equipment.

In connection with the equipment of the building the most modern type of doctors' in-and-out register and doctors' call system was installed. On the first floor adjacent to the lobby, but not in direct contact with the main office, the doctors have their coat room and in this coat room is the doctors' in-and-out register which they are required to punch when they come in. This in turn signals onto a board in the main office. Thus the office girls have direct knowledge of just which doctor is in the house. In connection with this is a signal system for reaching the doctor in the building for a call. Another feature is that a call may be indicated on the doctors' in-and-out register that there is a message for him at the office which he will call for as soon as he arrives at the hospital. The doctors' call system in the hospital is the silent type. Each floor and different rooms throughout the hospital are equipped with this lighting signal, which flashes the doctors' call numbers and flashes out when the doctors answer their calls. It is possible to signal for three doctors at one time.

The Bethesda Hospital is the most modern that could be conceived of at this time. No efforts and no money having been spared in making it as efficient and convenient for the sick as possible.

L. B. Benson.

THE CHILDREN'S HOSPITAL

SAINT PAUL

It has long been recognized that the health problems of children are by no means adult problems reduced to scale. Children require special treatment routine that general hospitals, unless unusually situated, cannot afford. To make possible this specialized service at a minimum cost, the Children's Hospital of Saint Paul was opened July, 1928. Since then, medical men of the Northwest have used this institution to the extent of caring for 4,344 of their difficult cases with its assistance. The patients have averaged about a ten-day stay. All admissions have been of children from birth to fifteen years of age.

The accompanying scene of happy children far away from the usual hospital surroundings gives only a partial glimpse of the institution's modern plant. Here private rooms are used for all cases during observation, in addition to having each ward bed separated by huge glass frames. Its staff room, operating facilities, oxygen tanks, biplane fluoroscopy table and X-ray machine are available at a surprisingly low cost. Routine laboratory examination is strictly followed with the results immediately available to the physician. The Children's Hospital can conveniently care for sixty patients.

A nursing school is operated by the hospital, the students being drawn from affiliated schools for a few months of pediatric work. About thirty students are enrolled.

During 1932 the Woman's Auxiliary of the hospital undertook a drive for a free bed fund. Several funds are now making the service of this hospital available to children who otherwise could not receive proper care.

Walter R. Ramsey, M.D., is medical director of the Children's Hospital. Sophie Yoerg is the superintendent.

DOUGLAS COUNTY HOSPITAL

ALEXANDRIA

The Douglas County Hospital is a fireproof structure, equipped with an electric elevator, modern operating room and equipment, portable X-ray unit, modern clinical laboratory facilities, fracture equipment, obstetrical and nursery departments with incubator. Four registered nurses are in attendance. The hospital is governed by ten directors.

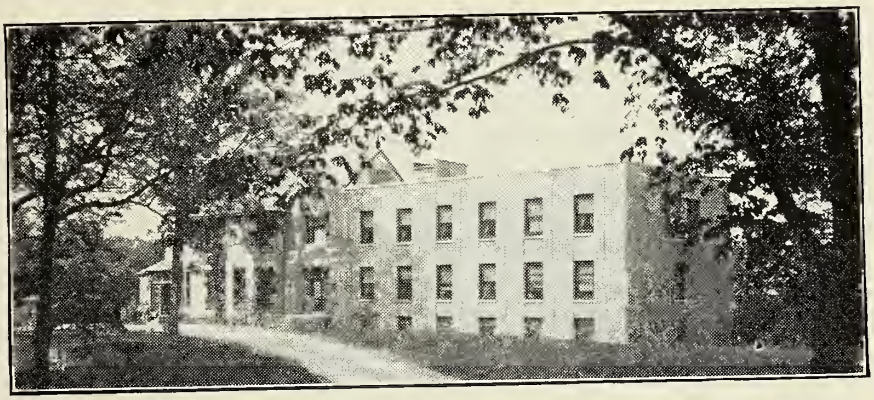
The hospital has been approved by the American College of Surgeons and its staff consists of the following: Dr. E. J. Tanquist, Medical Director, General Surgery; Dr. L. M. Boyd, Eye, Ear, Nose and Throat; Dr. E. R. Sather, Gynecology and Obstetrics; Dr. A. R. Blakey, Internal Medicine; Dr. C. R. Drake (Minneapolis), Consulting Pathologist.

The hospital offers to this community hospital facilities and service on a par with the larger hospitals and has shown an increasing number of patients.

FAIRVIEW HOSPITAL

MINNEAPOLIS

The year 1930 marked the twenty-fifth anniversary of the founding of Thomas Hospital. This institution, built out of funds donated by Mr. George B. Christian, was one of the first hospitals in this part of the country devoted to the care and treatment of those suffering with tuberculosis.



DOUGLAS COUNTY HOSPITAL—ALEXANDRIA

During the twenty-seven years that have elapsed since the first patient was received, there have been more than 40,000 patients treated.

The work still goes on, concentrated and centralized in a separate pavilion of Fairview Hospital. There are thirty beds available for tuberculous patients, subject to the call of the private practitioner. Specially trained nurses are in charge of the bedside care; all necessary appliances are available and charges are moderate. Thus Thomas Hospital goes on serving and the memory of George B. Christian continues to live.

FERGUS FALLS STATE HOSPITAL

FERGUS FALLS

A new receiving hospital for the reception of all the new patients admitted to the institution was completed and occupied on June 1, 1932. The cost of the building, without equipment, was $135,000. It has a capacity for 102 patients—fifty of the beds are for women and fifty-two for men. It contains two twelve-bed wards, a number of rooms that will accommodate two patients each, and fifty rooms for the occupation of single patients. Patients are entered at this building for observation, examination and care. They are then classified and transferred to wards appropriate to their condition.

The building conforms to modern standards of buildings of this type. It is entirely fireproof. The Browne steel windows do away with the necessity for screens or guards. Acoustical tile has been installed in the halls and corridors in order to absorb the noise. The building is therefore much quieter than the older type of buildings. The building is two stories high with a full basement. With the exception of the halls, where rubber flooring has been installed, the floors are terrazza. A dining room is situated in the basement of the women's side. Diet kitchens are provided on both the men's and women's wards and examination rooms

properly equipped are provided for men and women.

The most modern type of hydrotherapeutic apparatus has been installed in the building in order to give therapeutic baths. The apparatus contains the most recent safety devices.

The institution has just recently installed two new motion picture machines of the most modern type with sound apparatus in the Amusement Hall. Talking pictures have now replaced the silent pictures which we have exhibited for a great many years.



MIDWAY HOSPITAL—SAINT PAUL



GLEN LAKE SANATORIUM—OAK TERRACE

W. L. Patterson, *Superintendent.*

GILLETTE STATE HOSPITAL FOR CRIPPLED CHILDREN

SAINT PAUL

During the past year changes have been made in the Isolation Department of the Gillette State Hospital in order to care for contagious diseases that develop in the hospital. New floors were laid in the rooms, and plumbing connections put in so that running water and toilet facilities are now available in each room in the contagious unit.

A new operating table, new X-ray tube, a microscope for the laboratory, and necessary surgical instruments have been added to the equipment of the hospital.

About 50 per cent of the patients admitted during the past year have come because of the after effects of anterior poliomyelitis. We can take care of them through our Physiotherapy Department, which consists of two treatment rooms, two solaria, one swimming pool, which is used for therapeutic purposes, and a treatment room in the Out-Patient Department where out-patients are treated two days a week.

The treatment rooms are equipped with tables of various widths, with splints, bakers, radiant and thermolite lamps, diathermy, stall bars, mirrors, and so on. Each solarium is fitted with four ceiling ultra violet lamps, one portable air cooled quartz lamp, and one water cooled lamp.

The anterior poliomyelitis cases are treated on alternate days in the pool and treatment rooms. All exercises in the pool are carefully supervised.

Scoliosis, poor posture, spastic paralysis, arthritis, congenital dislocation of the hips, and many other postoperative conditions are also treated in the Physiotherapy Department. A weekly lecture is given to the student nurses. The staff in this department at pres-

ent consists of three trained physiotherapists and one graduate nurse.

Patients in hospital during the past year	759
Average daily population	231
Out-patient visits	8,824
Patients receiving dental care	600

Patients eligible for treatment in this hospital are those whose parents have been residents of Minnesota for one year. The parents must be too poor to pay for hospital treatment or to pay their doctor bills, and the patients must be orthopedic cases that can be helped by hospital treatment.

ELIZABETH MCGREGOR, *Superintendent.*

GLEN LAKE SANATORIUM

OAK TERRACE

In August, 1931, the new Vocational building of the Glen Lake Sanatorium was opened. This building was given the County of Hennepin by the Citizens' Aid Society of Minneapolis in memory of Henry Hall Christian, son of the late Mr. and Mrs. George H. Christian, the founders of the Society. It provides new occupational therapy quarters, well equipped class rooms and shops for vocational academic training, and new surgical and laboratory quarters.

The Publix Theaters are donating "sound" equipment so that "talkies" may be given for the amusement of the patients. It has been almost impossible to obtain silent pictures for the last year or two, and since movies are almost universally enjoyed this gift will be most gratefully received.

Dr. Ernest S. Mariette, Superintendent and Medical Director of the Glen Lake Sanatorium, was elected president of the Mississippi Valley Conference on Tuberculosis at its annual meeting held in Indianapolis in September, 1932.

HOMEWOOD HOSPITAL

MINNEAPOLIS

Homewood Hospital, a private institution, was established under the present management in 1922. This year, in celebration of ten years of satisfactory service to the public, Homewood has completely remodeled its interior. For a twenty-five bed hospital, though small



HOMEWOOD HOSPITAL—MINNEAPOLIS

as hospitals go, the expense involved in such a procedure is no small matter.

The combined talent of interior decorators and skilled chaftsmen has given to Homewood's interior a soothing quality of especial value to its patients, most of whom fall under the nervous classification.

Homewood specializes in nervous disorders, alcoholic and drug addicts. Its continuous bath facilities plus the new technician service instituted by its enterprising manager, Mr. R. T. Raskop, this year, offer to the medical profession rare supplementary aids in difficult cases. The technician service noted will consist of a complete routine laboratory examination as patients are admitted, at no additional cost.

The hospital is located near enough to the heart of Minneapolis so that it is only a three or four minute drive to the loop. It is far enough away so that its slogan—sunny, quiet, homelike—is indeed truthful.

MIDWAY HOSPITAL

SAINT PAUL

The Midway Hospital has now been in operation a little more than six years. It is a fireproof structure four stories above the basement, and having a capacity of 115 patients. The building and its equipment are modern throughout. The cost of the building including its equipment amounted to an expenditure of $750,000, which was raised partially through subscriptions given by the Baptist people throughout the Northwest and the business men of the Midway District of Saint Paul. It covers an eight acre site with frontage on University Avenue.

The hospital is equipped for the care of all general, medical and surgical patients and has a very thoroughly equipped maternity department. In addition to its modern, up-to-date X-ray Department the hospital has a limited amount of radium for the use of the members on the medical staff.

The Midway Hospital is affiliated with the Mounds Park Sanitarium and is operated under the direction of the same members of the Board of Directors. It is an accredited hospital and recognized by the American College of Surgeons as a Class A institution.

MINNEAPOLIS GENERAL HOSPITAL

MINNEAPOLIS

Several new features have been added to the General Hospital in the past two years. Physicians who in past years have interned at the General Hospital may be interested to know that the class rooms which for many years were on the eighth floor of the Nurses' Home have been moved to the ground floor, thereby contributing greatly to the health of students in the institution who previously had to climb eight floors to these classrooms because of the inadequate elevator facilities. The new arrangement has also proved a great time saver to both teachers and students. Incidentally, the hospital gained forty-three beds for nurses in the Nurses' Home by this new arrangement.

The hospital has added a central linen room. Formerly all linen was marked for the individual stations and went directly from these stations to the laundry, from which it was again returned directly to them after being sorted in the laundry according to the individual station mark. Under the central linen room plan all linen is simply marked "Minneapolis General Hospital." Soiled linen goes directly from the stations to the laundry, but instead of waiting for this same linen to be washed and sorted and returned to them from the laundry, the stations requisition immediately from the central linen room their clean linen needs. The new plan has eliminated the waiting period on stations for the return of their laundry, has eliminated in the laundry the tedious and time consuming sorting of linen for a large number of separate stations, and finally has resulted in the saving of about $200 per month to the institution in linen issue casts.

A central sterilizing and supply room has recently been added to the General Hospital set-up. All dressings are now made in the central sterilizing and supply room instead of on the individual stations as formerly. All sterilizing, which was formerly done in the operat-

ing room suit, is now performed in this central sterilizing and supply room. All forms of sterile trays are also stocked in this central supply room, where they can be requisitioned at a moment's nation by any station. This eliminates the time-consuming process of setting up these trays on the station for the individual case and the waiting for this to go to the operating room to be sterilized and returned to them. This service has also obviated the necessity for duplicating a great number of emergency supplies on all stations, and thereby has resulted in a very considerable economy in equipment maintenance.

Probably the most outstanding contribution of the Minneapolis General Hospital to the community has been the establishment within the past year of a thirty-two bed psychopathic unit. The need of a psychopathic unit in Minneapolis has been realized for many years, and numerous plans have been formulated for the establishment of such a unit. Although the present unit is limited as to capacity, it is felt, nevertheless, that it has contributed very materially to the needs of the mentally afflicted. This unit has been staffed with nurses specially trained by postgraduate study in the care of the insane, and with attendants of similar training and experience.

CHARLES E. REMY, M.D., *Superintendent.*





MINNESOTA STATE SANATORIUM

MINNESOTA STATE SANATORIUM

AH-GWAH-CHING (CASS COUNTY)

The Minnesota State Sanatorium opened, for acceptance of patients, in December 1907, with a bed capacity for fifty patients. With the completion of the new infirmary building in March, 1932, with a maximum capacity of eighty beds at a cost of $100,000, the institution now has 350 beds for treatment of tuberculosis. These beds are all enclosedd in heated rooms, with modern service. Surgical work is referred to the University Hospital. Transportation is effected over all-weather roads by heated cars.

The State Sanatorium is the only institution, for the care of tuberculosis, under the administration of the State Board of Control. The law requires a uniform charge of $1.40 per day for all cases admitted. The Sanatorium has been run with this cost plus a deficit of 50 to 65 cents per day, making the total operation cost $2.00 per day. It is hoped that this deficit can be materially reduced, at the same time increasing the service to the patients during the next two years.

H. A. BURNS, M.D., *Superintendent.*

MINNESOTA COLONY FOR EPILEPTICS

CAMBRIDGE

The Minnesota Colony for Epileptics was established in 1925 for the care and treatment of epileptic patients residing in the State of Minnesota. It is located just south of Cambridge on Highway No. 5 and the Great Northern Railroad. It owns 341 acres of land, has an inmate capacity for 650 patients, and ninety-eight employees. The value of the land and buildings is $953,878. The institution is built on the cottage plan and consists of the Administration Building, which houses the service departments, hospital wards, and wards for the younger patients. Also six cottages for inmates which house about 100 each, together with power plant, garage, root-cellar, dairy barn, piggery and horse barn. We receive patients of both sexes and all ages, although our present facilities for young children are very limited, and the Colony cannot care for

epileptics who are insane, markedly delinquent, or very low grade mentally.

At the present time we have two separate and distinct procedures for admission. The first and most commonly used is that of committing a patient to the custody of the State Board of Control as feeble minded. This is done by the Probate Court in the county in which the patient resides and is applicable to all patients having an I.Q. of .75 or below. The other method of admission is the voluntary admission of patients whose I.Q.'s are above .75. This applies to the very few patients in which no deterioration has taken place. After admission to the institution all patients are placed on the same basis. The only difference being that the voluntary patients may leave at any time they care to or may be discharged by the Superintendent, while committed cases are only released by action of the State Board of Control.

A charge of $40.00 per year, payable annually in advance is made toward support of each and every patient. This is to be paid by the relatives if they are financially able. If not, the counties must assume this payment.

D. E. McBroom, M. D., *Superintendent.*

MOUNDS PARK SANITARIUM

SAINT PAUL

The Mounds Park Sanitarium was founded in 1905 and is located on a block of ground adjacent to the beautiful Indian Mounds Park, Saint Paul. Under able leadership the efficiency of the first unit of this hospital was raised to an enviable position. Mounds Park Sanitarium was one of the first hospitals in the Northwest to be rated as a Class A institution by the American College of Surgeons. To meet the increasing needs for rooms for patients additions were made until now it has a capacity of 125 patients.

Mounds Park is a general hospital and in addition has a special department for psychiatric and nervous patients. It is operated under a Board of Directors and is organized for non-profit. It is affiliated with the Midway Hospital, and has a Training School for 105 students, which is also affiliated with the Midway Hospital.

The Mounds Park Sanitarium has an exceptional Occupational Therapy Department. During the last two years it has initiated a golf course on its beautiful grounds and in addition has facilities for croquet, horseshoe and other outdoor games for convalescent patients.

The hospital is fully equipped with every modern convenience and includes an obstetrical department in addition to its general, surgical and medical departments.

MUDCURA SANATORIUM

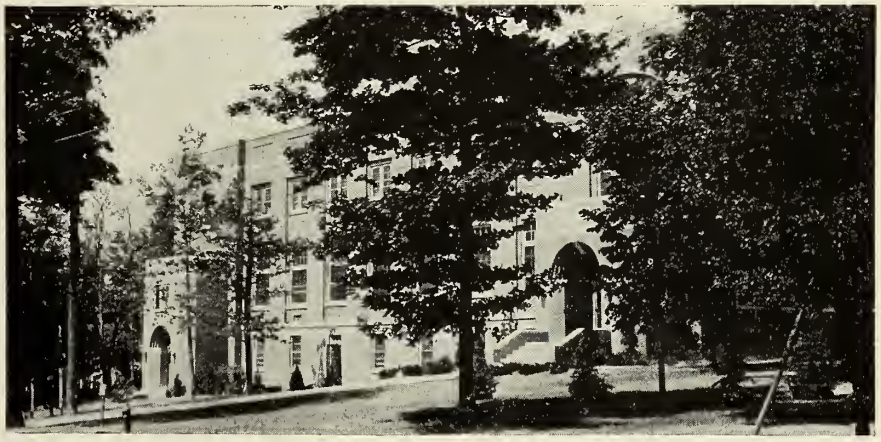
SHAKOPEE

Before the white man came to Minnesota, the springs of Mudcura, near Shakopee, were known as a curative agency to the Indian. After the white man came, heard the legends told of these springs, and scientifically considered their value, Mudcura as an institution began a long, useful service to patients suffering from certain diseases.

Mudcura is more than an ordinary bath house, its hotel accommodations being superior to most sanitariums and bath houses. All the rooms are outside rooms, airy and spacious, equipped with steam heat, electric light and telephone, richly furnished throughout. The dining room and kitchen are adequate to the rest of the hotel departments. In the basement are the smoking room, billiard room, barber shop and large recreation hall.

Over the east and west porches are the two large sun parlors. These make ideal resting places for the invalid, as well as for others in inclement weather, in the early spring and late fall.

The medical director and house physician who are in continual attendance require each patient to undergo a thorough physical examination before commencing the baths. Thus, contagious, infectious and other objectionable diseases are excluded. The amount and kind of exercise is also prescribed, as well as the diet. A graduate dietitian is employed. Dr. H. P. Fischer is the medical director of Mudcura Sanitarium.



NOPEMING SANATORIUM—NOPEMING

NOPEMING SANATORIUM

NOPEMING

Nopeming is located eleven miles from Duluth on Highway No. 1. The sanatorium is the St. Louis County sanatorium for tuberculosis and has a capacity of 230 beds. It was opened in May, 1912, and has therefore been in operation twenty years. For the past seven years St. Mary's and St. Luke's Hospitals in Duluth have admitted tuberculosis patients in special wards, and all free patients in these departments have been under the care of the Nopeming Sanatorium staff, as are the tuberculosis clinics in the out-patient departments of these hospitals. These clinics are con-

ducted in cooperation with the Duluth City Health Department.

On the Iron Range, tuberculosis clinics are held regularly by the County Health Officer, Dr. G. J. Ferreira, and members of the Sanatorium staff.

The Sanatorium itself is operated under the general supervision of the State Board of Control, by the St. Louis County Sanatorium Commission, of which Dr. E. L. Tuohy is the president. Dr. A. T. Laird is superintendent of the Sanatorium. Other members of the medical staff are Dr. J. G. Lamont, formerly of North Dakota, Assistant Medical Director, Dr. J. J. Rouse and Dr. G. A. Hedberg. Dr. R. M. Mayne has immediate charge of the patients in the Duluth hospitals.

Nopeming Sanatorium has been approved by the American College of Surgeons and by the American Medical Association for residency in tuberculosis as a specialty.

During the year the Nopeming water supply has been improved and now the water used is obtained from Lake Superior through Duluth City mains.

A new service building was completed in 1931.

A. T. Laird, M.D., *Superintendent.*

NORTHWESTERN HOSPITAL

MINNEAPOLIS

The Northwestern Hospital celebrated its Fiftieth Anniversary on November 22, 1932. Approximately 1,000 friends and former patients attended a tea which was given at the hospital.



PROPOSED ST. BARNABAS HOSPITAL

While no new buildings have been erected the past year, a very large amount of money has been expended in equipment. The most important hospital event of the past year was the resignation of Mrs. Pearl Rexford, who had been connected with the hospital for approximately twelve years. Mr. Harry Brown, the new superintendent, assumed charge of the hospital in September, 1932.

ST. BARNABAS HOSPITAL

MINNEAPOLIS

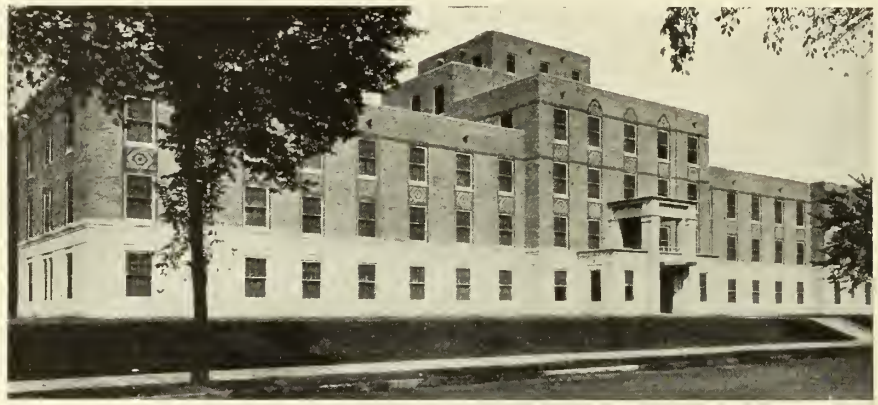
St. Barnabas, as a Cottage Hospital, was founded in 1871 by the Rt. Rev. David Buell Knickerbocker, then Rector of Gethsemane Church in Minneapolis. Ten years later it became an institution of the Protestant Episcopal Church and is so maintained at the present time.

Funds were provided for the erection of a new St. Barnabas Hospital by the late E. C. Whitney of Ottawa, Canada, in memory of his wife, who was cared for in the little Cottage Hospital, now St. Barnabas, more than fifty years ago.

The securities in which the funds were invested have so shrunk in value as to necessitate indefinite postponement in building.

The accompanying illustration is that of the proposed new St. Barnabas, plans for which were perfected in 1930.

Harriet S. Hartry, *Superintendent.*



SWEDISH HOSPITAL—MINNEAPOLIS

ST. LUKE'S HOSPITAL

DULUTH

The following is a list of the officers of the St. Luke's Hospital staff for the year 1933:

Chief of Staff, Dr. D. E. Seashore; Vice Chief and Chairman, Program Committee, Dr. Gage Clement; Secretary, Dr. Gordon C. MacRae; Chief—Surgery, Dr. A. E. Olson; Chief—Medicine, Dr. C. M. Smith; Chief—General Medicine, Dr. Robert Nelson; Chief—Obstetrics, Dr. Robert Forbes; Chief—Pediatrics, Dr. R. E. Nutting; Chief—Ear, Eye, Nose and Throat, Dr. A. G. Athens.

James McNee, *Superintendent.*

SWEDISH HOSPITAL

MINNEAPOLIS

The Swedish Hospital of Minneapolis is a modern general hospital with a capacity of 300 beds, seven operating rooms, fully equipped clinical laboratories, radium and X-ray service. The new building, erected in 1928, contains every modern equipment for good medical care, both in its laboratories and operating rooms, as well as its patients' rooms. It is fully accredited by

the American College of Surgeons as a Class A hospital and fully approved by the American Medical Association for internship.

The Swedish Hospital was founded in 1898 and has grown within that period from small beginnings with a capacity of twenty-five beds to a hospital occupying an entire city block, surrounded by Ninth and Tenth Avenues and Seventh and Eighth Streets, with a building occupying a quarter block across the street on Tenth Avenue and Eighth Street.

The first year the hospital admitted 238 patients and during 1931 there were 6,137 patients admitted. The total number of patients since the opening of the hospital admitted is 129,133. The membership on its staff of doctors and surgeons now numbers seventy-four.

The hospital has served the sick and needy of this community in the Northwest for more than thirty-three years. It is non-profit sharing and a non-sectarian hospital founded on Christian principles by the Swedish Hospital Association thirty-three years ago.

Its splendidly equipped maternity department has enjoyed a steady patronage, an average of 800 babies being born every year. The past year shows a record of 15,439 laboratory examinations and 5,696 X-ray treatments and examinations. Radium service was rendered in 386 cases, and there were 3,728 surgical cases.

The charity work of the hospital has been extensive, especially during the last two trying years. This service has been gladly rendered and efficiently carried on through our social service department in conjunction with the Concordia Society.

Since its founding the Swedish Hospital Training School has graduated approximately 650 nurses, a force specially adapted and prepared to minister to the sick.

The officers of the Board of Trustees are Mr. E. G. Dahl, president; Mr. B. A. Lindgren, vice president; Mrs. A. M. Nordstrum, secretary; and Dr. A. E. Johnson, treasurer.

The Chief of Staff is Dr. C. A. Stewart. Mr. William Mills is the General Superintendent, and Miss Hannah Burggren, R.N., Superintendent of Nurses.

TAYLOR MEMORIAL SANATORIUM

POKEGAMA

Pokegama Sanatorium, the Northwest's private institution for tuberculosis, will operate in the future as the Taylor Memorial Sanatorium. The organization of the H. Longstreet Taylor Foundation, named after Minnesota's great crusader against tuberculosis, has just been announced. The corporation has been formed on a non-profit basis under Minnesota law by the directors of Pokegama Sanatorium. The Pokegama staff will be retained. Ten members of the medical profession from various parts of the state will serve as a board of medical advisors for the new institution.

The movement for a memorial to Dr. Taylor began shortly after his death, January 2, 1932. At that time he was planning the construction of a new nurses' home which would complete the building plan at Pokegama. Dr. Taylor founded Pokegama in 1905. The reception hospital, built on the latest approved lines for the care of tuberculosis, was finished in 1924. The Taylor Memorial Sanatorium, under the direction of Dr. F. F. Callahan, will continue to maintain a nurses' training school and a fellowship at the University of Minnesota.



PROPOSED NURSES' HOME, TAYLOR MEMORIAL SANATORIUM—POKEGAMA

The plans for a new nurses' home will be effected as soon as conditions permit. It will be a memorial to Miss A. Reba Merrill, R.N., who organized the training school and was superintendent of nurses from 1922 until her death in 1929.

The board of medical advisors consists of Dr. Charles L. Schofield, Benson; Dr. O. E. Locken, Crookston; Dr. E. L. Tuohy, Duluth; Dr. W. S. Lemon and Dr. R. M. Wilder, Rochester; Dr. R. G. Allison and Drs. W. A. O'Brien, Minneapolis; Dr. Arnold S. Anderson, Dr. L. E. Dougherty and Dr. E. K. Geer, Saint Paul.

The accompanying illustration shows the architect's plan for the proposed Reba Merrill Memorial Nurses' home at Pokegama, Minn. Facing the hospital, it forms a plaza, with the administration building and patients' cottage on either side. It will be the completing unit in Taylor Memorial Sanatorium. Ellerbe and Company of Saint Paul are the architects.

VETERANS ADMINISTRATION HOSPITAL

MINNEAPOLIS

A construction program has recently been completed at the Veterans' Administration Hospital, Minneapolis, Minnesota, involving the expenditure of approximately $132,000, which includes the erection of a new warehouse unit, wing additions to the Administration and Infirmary Buildings, and alterations to the Neurosychiatric Building.

This construction was completed under the personal supervision of Mr. C. D. Hibbard, who in addition to his duties as Manager in charge of the Hospital,

was designated by the Veterans' Administration in Washington to act as Construction Superintendent.

The new warehouse building is a four story structure, 50 by 110 foot, which was completed on August 29, 1932. Heretofore, the Hospital has been hard pressed to find floor space for storing reserve supplies and equipment which, because of the scant warehouse facilities available, overflowed the allotted limits and had to be stored in the attics of the various hospital buildings scattered over a wide area. The new warehouse affords adequate storage space with proper protection to supplies, in locations where they are readily accessible and can be handled expeditiously and economically. A root-cellar in the basement will enable the hospital to purchase perishable subsistence supplies such as vegetables and fruits in larger quantities at much better prices, thereby effecting a considerable saving.

Work on the wing additions to the Administration and Infirmary Buildings and the alterations to the Neuropsychiatric Building was completed the early part of December.

The Urological Service, formerdy located in the Infirmary Building, increased to such proportions that its former quarters were entirely inadequate in size, and it became necessary to reserve an entire building to house this activity. For this purpose the Neuropsychiatric Building has been remodeled ot provide for this service suitable laboratory, X-ray and operating room facilities, while at the same time all patients receiving treatment for this class of disability will, when the building has been fully equipped, be provided with bed space in the remodeled building. All mental patients have been transferred to the Veterans Administration Hospital at St. Cloud, Minnesota.

The 45 by 85 foot three story addition to the Administration Building is designed to provide room for the expansion of administration activities which have been greatly overcrowded in the past, and permit concentration of all such activities, sections of which, because of lack of space, had to be located in hospital buildings. This rearrangement will release additional space for beds in the hospital buildings.

The wing addition to the Infirmary Building, four stories high, provides, in addition to the room released by the removal of certain offices to the Administration Building, floor space for approximately ninety additional beds, including six beds for observation of nervous and mental conditions.

While all the buildings comprising the station have been in an over-crowded condition, this is particularly true of the Infirmary Building. The new addition will make possible the installation of a systematic arrangement of facilities for routing claimants through the medical clinic for physical examinations. It also provides increased clinical facilities, including a new waiting-room, showers and dressing room with individual lockers for claimants, additional examining rooms, which include a proctoscopic unit; and permit the transfer of the electrocardiograph and dark rooms from their present location to the clinic.

With the completion of this construction program, ex-servicemen are assured of a decided improvement in the service which will be rendered to them at this hospital, and the bed capacity has been increased to approximately seven hundred beds.

W. A. Colton, *Chief Medical Officer*



VETERANS ADMINISTRATION HOSPITAL—MINNEAPOLIS

VETERANS ADMINISTRATION HOSPITAL

SAINT CLOUD

The Veterans' Administration Hospital, Saint Cloud, is one of eighteen federal neuropsychiatric hospitals, and is located on Sauk River about three miles from the city of Saint Cloud. There are, at present, 550 patients—all nervous and mental cases. These patients are sent from the states of North and South Dakota, Minnesota, Wisconsin and Iowa. At the present time there is under construction at this hospital a new building which will house approximately one hundred and seventy-five patients, and which will cost $221,021.00. In addition to the new building, porches are being constructed on the other buildings, and the Recreation Building is being doubled in size.

The staff consists of seven physicians, three consultants, one dentist, one librarian, sixteen nurses, one laboratorian, seven occupational therapy, physiotherapy and recreational aides, one dietitian, one physical director, seventeen clerical assistants, sixty-nine attendants, and sixty-seven other employees. This hospital is equipped with a splendid clinical service, dietary department, laboratory, in charge of an experienced laboratorian, X-ray laboratory, and physiotherapy department, in which all the up-to-date modalities are found.

In connection with this hospital there is a farm, consisting of about 600 acres. This gives many of the patients training in agriculture, dairying, floriculture, gardening, and so on. It is obvious that the administration of occupational therapy in a hospital of this kind is of outstanding importance, as the rehabilitation of mental patients in most instances is dependent on the administration of occupational therapy.

The library is up-to-date, and in addition to all up-to-date books the library contains some sixty different magazines and many of the larger newspapers. The recreational aide plans the various recreation activities, such as games, parties, movies, and so on. The physical director is responsible for giving such patients as are not capable of doing manual work, exercises which are conducive to building up their general health.

Hans Hansen, M.D.
Medical Officer in Charge.

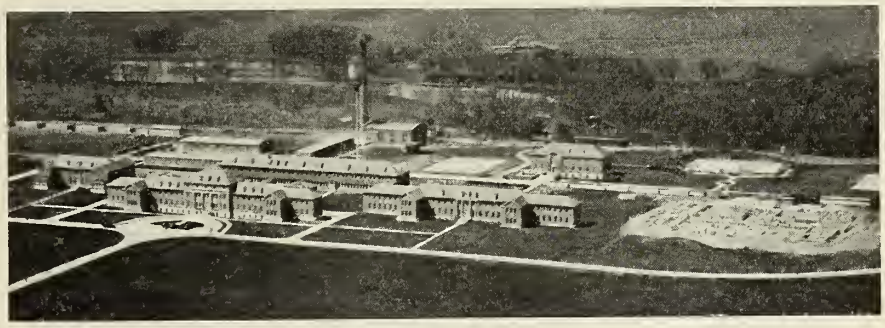
WILLMAR STATE ASYLUM

WILLMAR

This institution was established by the Legislature of 1907 as a hospital farm for inebriates. In order to provide funds for the purchase of land and the construction of buildings the act provided for the levying of a tax of 2 per cent upon all license fees for the sale of intoxicating liquor. The original institution was opened in 1912. In 1917 the act was amended to provide for the care of the chronic insane, and the same year ninety-one patients were transferred to the institution from the Fergus Falls, Rochester and St. Peter State Hospitals. In 1919, the name of the institution was changed to the Willmar State Asylum.

A charge of $10.00 a month or less is made for each patient, based upon the ability of the spouse, parent or guardian to make payment. If indigent, there is no payment. Collections are not made by the hospital, and the money, when collected, goes into the general revenue fund of the state.

The treatment of inebriates has been continued, but the larger part of the population is composed of insane persons transferred from the hospitals. Patients may be paroled when, in the opinion of the superintendent, this seems advisable. On June 30, 1932, there were on parole from this institution twenty-six insane patients and 116 inebriates.



VETERANS ADMINISTRATION HOSPITAL—SAINT CLOUD

The buildings include an administration building with two wings for patients, five cottages for men, six cottages for women, superintendent's cottage, service building and assembly hall, power house, laundry, farm buildings and cottages for the farmer and engineer.

Inmates population, 1,235; land area, 706 acres; officers and employes, 104; value of land and buildings, $1,236,149.

B. F. Smith, M.D.
Superintendent.



N. O. Pearce, M.D.
President, Minnesota State Medical Association

EDITORIAL

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TEACHING VALUE OF THE HOSPITAL OUT-PATIENT DEPARTMENT

The growth in both the number and capacity of hospital out-patient departments has been one of the outstanding developments of medical organization during the last decade. Throughout this period of rapid growth, the quality of service rendered has been steadily improving as the concepts of the old-fashioned dispensary have shifted towards the out-patient organization ideal of a well managed diagnostic clinic.

The teaching hospital has been particularly active in bringing about this improvement in quality; however, it is only in the last three or four years that the possibilities which the out-patient department hold for medical education have become appreciated. It is generally recognized, of course, that the average type of clinical case seen in the out-patient department is quite different from the one admitted to the hospital service and is more representative of the average physician's practice than the usual hospital case. The facts which are not generally appreciated concerning the teaching value of the out-patient department are certain elements of internal organization which should be present if the maximum effectiveness in training is to be obtained. These elements are as follows:

1. The out-patient department should be an integral part of the hospital and closely correlated with the various hospital departments. Insofar as possible the admittance, discharge, financial, laboratory and X-ray services should be fused. This facilitates the coöperation between departments which is the primary essential of any diagnostic clinic.

2. One staff member should assume responsibility for each patient. If any transfer of such authority is made, there must be no doubt as to where this responsibility is vested at all times. No matter how many consultants are called or how many laboratory tests are involved, good medical care cannot be effective either with respect to diagnosis or treatment if some one staff member does not accept the responsibility of the particular patient involved. The patient should know at all times that this is his doctor, to whom he can turn and who will evaluate for him the complex and frequently diverse opinions of consulting staff and internes.

3. Just as some one staff member is the responsible physician in charge of the patient, so one interne or student should be assigned to the patient acting in exactly the same rôle as the responsible staff physician except that the responsibility is not vested in his hands. His duties involve taking the preliminary history, making a general physical examination, ordering laboratory work, suggesting desirable consultation, and expressing a preliminary diagnosis. The training value depends very largely upon the student being able to compare his own judgment with that of a senior physician. If the staff physician does not make an independent examination and diagnosis most of the teaching value is lost.

4. If, in addition to this relationship between student, patient, and responsible staff physician, it is also possible to arrange and systematize the out-patient department so as to make it possible for the student to be present at every staff consultation on this patient and to be informed of

all events if the patient is hospitalized, then the training experience obtained from an out-patient apprenticeship can scarcely be surpassed.

It is becoming increasingly apparent that the out-patient department, which is rapidly becoming one of the major elements in medical organization and an indispensable device for handling of the ambulatory patient is also proving to be a most important adjunct to medical education.

Halbert L. Dunn, M.D., Ph.D.
Superintendent of University Hospital.

EQUALIZING THE COST OF HOSPITALIZATION

As far back as 1926 the unequal distribution of the cost of medical care was felt to be enough of a social problem to warrant a thorough investigation in the hope of arriving at some solution. Ergo—the Committee on the Cost of Medical Care.

Among the numerous findings of the Committee was the fact that illness requiring hospitalization accounts for 50 per cent of the total costs of medical care. It was also determined that one out of every seventeen individuals, or one out of every five families, requires hospital care during the year. The average yearly cost of medical care for families with an income ranging from $2,000 to $3,000 a year was only $67.00 for those not requiring hospital care, whereas the average cost for families needing such care was $261.00.

These figures make very clear the fact that illnesses requiring hospital care were particularly burdensome to that percentage of families so unfortunate as to require hospitalization, even before the present period of depression. Any method devised to equalize this cost, which in a certain small percentage of cases is likely to prove catastrophic, should be welcomed by the public, the hospitals, and the medical profession, providing such method does not increase the total cost of this particular item in the cost of medical care, and providing, too, that the relation between the patient and his physician is not upset.

The group hospitalization plan which has made much headway in Saint Paul and which is being seriously considered in Minneapolis, the details of which were explained in an editorial in Minnesota Medicine last month, meets in part at least the requirements outlined. The hospitals are to manage the undertaking at a minimum cost of operation and without any thought of financial gain; the patient insured is undisturbed in his choice of physician, and patient and physician determine the hospital as at present.

Of course, substantially all the hospitals in any one locality must join the undertaking if the plan is to work smoothly. Selfish considerations on the part of one or more individual hospitals or individual physicians are inconceivable. The proposal, rather than being a step further toward the complete socialization of medical care, is simply the application of insurance principles to help relieve the burdensome cost of illness requiring hospitalization.

Objection has been raised that the hospital laboratory will, by means of this insurance, compete unfairly with the physicians who maintain their own laboratories. After all, if a patient can provide for this service by insurance it is a shortsighted policy to allow this consideration to bear weight in the attitude of the profession to the proposition as a whole. There is a decided need of devising some remedies for relieving the unequal costs of sickness, and there is unanimous medical opinion that ways and means should be provided in medical circles rather than by lay organizations.

Some such plan as the one proposed is a step in the right direction and County Medical Society representation in the management of the organization should prevent possible abuses from lay influence.

C. B. D.

OUR POLITICAL ACTIVITIES

The air is full of observations on taxes, bonuses, depression and economic travail. It is facetiously written, "If all the economists in the world stood hand-to-hand around the world they would not arrive at a common conclusion!" Pessimism challenges hope even where science might displace emotional expedients aimed at stabilization. "The one thing that history teaches is that it teaches nothing." Must this cynical statement ever go unchallenged?

The medical profession desires to do its utmost for society and humanity, at the same time maintaining its independence. With this in mind let us follow for a moment a few pages from the history of our railroads: A vice president of a substantial railroad recently wrote, "The railroads asked for no paternal protection—it was handed to them. Most of the fatherly protection has turned out to be stepfatherly 'don'ts'." The rails were given monopolistic domain, and with it munificent land grants. They did not have to wait long for the heavy hand of the tax gatherer, and, what was even worse, regulating discipline most exacting in degree and extent. The largess of the early period has yielded to a period of dependency, in which it looks to many that the railroads must inevitably slip into some form of public ownership and private control is nearly lost. Much railroad mileage and equipment should be junked; other forms of transportation merged or coördinated with railroading. The burden of taxation and management, competition and litigation crushingly onerous—all this in the face of an admittedly indispensable economic instrument.

Few would deny that modernized medicine is not equally indispensable. Comparatively speaking, medicine has also tended to outgrow the ca-

pacity of the public to secure its utmost possibilities without devising formulæ for public aid that immediately bring burdens of taxation and regulation that destroys effectiveness. Obsolescence in hospitals and clinical equipment, not to mention points of view, obtrude themselves, that are no easier to dispose of than the useless railroad mileage. Despite our apparent isolation other forms of promoting human acceptance and comfort intrude upon our field. In periods like the present people are finding out how well they can get along without the solace of an individual doctor.

At this critical stage we become politically minded and join up with blocs. This move may be inevitable and necessary—but it is certain that for every political advantage we may gain Providence will visit upon us a hundredfold of adversity through sharing the vicissitudes and misfortunes of "stepfatherly" politicians. This thought might well be with us at a time when the battleground of social experimentation has shifted to our commonwealth.

E. L. T.

ABUSES IN VETERAN RELIEF

There has been a decided recent change in the attitude of the public towards the policies of the Veterans' administration. The protest of the medical profession when free hospital care of veterans was extended to non-service connected disabilities, met deaf ears. Now the general policy of handing out not only hospital care but millions of the taxpayers' money to individual citizens simply because they are ex-soldiers, has made such a drain on federal resources that citizens are rightly concerned about the future.

The radio broadcast on October 26, prepared by General Frank T. Hines, Administrator of Veterans' Affairs, brought out some interesting food for thought. The Civil War veterans have cost the government some seven and a half billions. Already the World War veterans have received some six billions, exclusive of government insurance disbursements and loans on the so-called bonus. Monetary benefits are being paid to nearly one in five of those who served in the World War. General Hines estimates that the next ten years will cost an additional billion dollars "provided further liberalization of our veteran relief laws is not effected." He recommended a revision of the policies of the Veterans' Administration.

Congressional investigation now in progress should bring out the imperative need for such a revision for financial reasons and in justice to all concerned. This revision should not and need not affect compensation to those suffering disability due to service. Non-service expenditures should, however, be discontinued.

The National Economy League is doing much to crystallize public opinion and the League is being backed by the leaders of the medical profession. Now is no time for the profession to compromise with this evil of the extension of the government into the field of private practice which has been such an injustice to the private hospitals, the medical profession and taxpayers.

C. B. D.

"SPLINT 'EM WHERE THEY LIE"

It seems strange that the importance of proper ambulance equipment for rendering first aid in accident cases has not been more generally appreciated. Many practitioners carry rather complete first aid equipment in their cars so as to be prepared for emergencies. There is no excuse for police and hospital ambulances not being well equipped.

Hospitals can do much towards correcting such carelessness by insisting that proper dressing and splinting have been carried out on patients brought to their doors. The exchange of splints for those on patients admitted facilitates the maintenance of equipment in the ambulances, as brought out in an article on the subject by Dr. R. C. Webb in this issue of Minnesota Medicine. Dr. Webb lists the equipment which should be carried by an ambulance and stresses the importance of first aid, particularly in fracture cases.

Fully as important as first aid immediately following the injury is the care of the accident case on admission to the hospital. Each hospital should have an established routine for the care of the accident case which should include aseptic care and a minimum of manipulation after admission to the hospital.

DISCONTINUANCE OF PROGRESS SECTION

It has been deemed advisable by the Editing and Publishing Committee to discontinue the publication of extracts of current literature under the section title of Progress. This section has been continued since the beginning of the journal with the idea of stimulating interest in the state publication, and we think has served that purpose. With the necessary limitation in the size of the journal, the elimination of this section will provide more space for the publication of articles and will facilitate their more prompt publication. After all, this section is a duplication of what is being done in other journals much better than we could ever hope to do.

We wish to take this occasion to express our appreciation of the efficient supervision of the Progress Section in recent years by Dr. L. M. Daniel. A number of members of the Association have shown an interest in their journal by submitting abstracts to this department over a period of years. This has been greatly appreciated.

President's Letter

IN THIS first message to the members of the Association I wish to express my sincere appreciation of the great honor you have accorded me. It is my earnest hope that I may have the personal friendship and assistance of each one of you in my efforts to carry on the present high standard of accomplishment for the physicians of Minnesota, as exemplified in the progress of the Association under the leadership of my predecessors.

In my mind the duties of a State Medical Association may be divided broadly into: (1) the advancement of medical science; and (2) the maintenance of sound medical economic conditions in order that a physician may, without outside interference, devote his time and thought to his professional duties and receive a reasonable compensation therefrom. A third duty, that of protecting the public in its dependence upon the profession for care in sickness, developes upon our organization of necessity. A recognition of our obligation to the public must underlie all our activities, or we shall not survive.

The first premise—that of scientific progress—lies within ourselves to accomplish and all of you have readily embraced the many opportunities afforded to amplify your knowledge and skill. We may justly take pride in the high standard of medical practice in Minnesota, and the present administration will strive to maintain and further all the facilities for medical advancement now made possible by the State and County organizations.

In the second premise—that of the economic conditions—I believe that most of us now realize that certain new forces, outside of the profession, are exerting an ever-increasing pressure which is creating new problems in ethics and economics.

We are living today in a new era in which formerly well established standards no longer retain their old significance. Among physicians any broad change in medical practive presents at once a very complex problem, and it must be solved by us in such a manner as to preserve our present high ideals of practice, or it will be solved for us by those who are interested more in the social or economic phase of the problem and who have little interest in or knowledge of the ideals and traditions of the profession. The problem of readjustment is here. We must face it squarely and devote our energy and intelligence to a sensible solution, the result of careful study and mature judgment.

I am convinced that any scheme of insurance compensation or contract practice that disturbs the intimate relationship between the family and the physician, and the faith of the family in his work, is bound to end in disaster. With this fundamental principle as our guide we shall do our utmost to bring about a satisfactory readjustment.

Yours most sincerely,



President,
Minnesota State Medical Association.

OF GENERAL INTEREST

Dr. R. S. Laney, formerly of Oakland, California, and Browns Valley Minnesota, has assumed Dr. Borgerson's former practice at Hewitt.

Dr. Henry E. Michelson, Minneapolis, delivered the oration on syphilis before the Manitoba Medical Society at the provincial medical meeting in October, 1932.

Dr. Oscar J. Engstrand has announced the opening of offices at Chicago Avenue and Franklin, Minneapolis, for the practice of diagnosis and general surgery.

Dr. Wesley Spink, Duluth, on receiving his medical degree at Harvard in June, 1932, obtained a research fellowship at Harvard and is devoting his time to studies of blood dyscrasias.

Dr. K. A. Walfred, formerly of Cold Spring, has been named as the successor of the late Dr. O. J. R. Freed as head of the staff of the Cokato Hospital, Cokato, Minnesota, where he is now located.

Dr. Hendrie W. Grant, formerly associated with the Miller Clinic, Saint Paul, announces the opening of offices at 326 Lowry Medical Arts Building, Saint Paul, where he will continue to specialize in ophthalmology.

Dr. Richard R. Cranmer, member of the medical staff of Asbury Hospital, Minneapolis, for twenty years, has been president of the staff. Dr. Cranmer succeeds Dr. A. H. Park, who has been named to the advisory board.

Dr. Charles H. Mayo, Rochester, recently elected president of the Minnesota Public Health Association, has been appointed a member of the advisory board of the Minnesota Congress of Parents and Teachers. He will succeed Dr. J. A. Myers, Minneapolis.

Dr. A. H. Borgerson, formerly of Hewitt, Minnesota, has purchased the practice of Dr. E. A. Lodmell at Sebeka, Minnesota. Dr. Lodmell, who has received an appointment in the Army Medical Corps, left December 10, 1932, for Fort Leavenworth, Kansas, to attend the General Staff Training School.

Washington University has again placed the facilities of its clinics at the disposal of the reserve officers of the Medical Department of the United States of America. A school for inactive duty training will be held there from February 12 to 25. This is a course similar to the one held in October at the Mayo Clinic, Rochester.

Dr. Edwin Henes, Jr., of Milwaukee, has resigned as Executive Secretary of the Inter-State Postgraduate Medical Association after serving in that capacity for a period of ten years. During this period the Annual Assembly has grown to be one of the outstanding national medical meetings. Dr. Henes' duties will be taken over by members of the Board of Trustees. Registration will be supervised by Dr. Tom B. Throckmorton of Des Moines, exhibits by Dr. Arthur G. Sullivan of Madison, and publications by Dr. William B. Peck of Freeport, Illinois.

Through the collaboration of the Minnesota State Historical Society and the Highway Commission a suitable marker was dedicated on November 23, 1932, with appropriate ceremonies, at the old homestead of Dr. William Worrall Mayo at Le Sueur, Minnesota. Among the speakers were a number of acquaintances of Dr. W. W. Mayo and tribute was paid to the sterling qualities of this pioneer Minnesota physician.

Dr. W. W. Mayo, the father of Dr. William and Dr. Charles Mayo, was born in England, in March, 1819, and studied physics under John Dalton. His education was completed in this country. After serving as county commissioner in Michigan, he practiced for a short time in Saint Paul and then moved to Le Sueur. The Mayo homestead was built there in 1858.

Minnesotans will be interested to learn that Dr. Adolph Hanson of Faribault has been given the credit of having been the first to prepare a parathyroid extract. Dr. Hanson's patent to this important hormone extract was confirmed by the United States Patent Office, December 13, after a long drawn out controversy with several rival claimants. Among these were Louis Berman of New York and James B. Collip of Montreal.

The fact that Dr. Hanson is a lone investigator without backing or assistance from any great institution or medical foundation made it more difficult, no doubt, for him to establish his claim.

It is important to note, in answer to criticisms directed against patenting such medical discoveries, that many of the most useful of modern medical agents have been patented. Insulin is a conspicuous example. In this case Dr. Hanson was obliged to take his discovery through the patent courts in order to protect his process and product, as well as himself. Incidentally, a patent is the only effective protection for the public and the medical profession against the manufacture of unreliable and inferior products.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

PHILIP MUELLER PLEADS GUILTY TO MANSLAUGHTER

State of Minnesota *vs.* Philip Mueller

On December 16, 1932, the Honorable W. C. Leary, Judge of the District Court, sentenced Philip Mueller to a term of ten to forty years in the State Prison at Stillwater for manslaughter in the first degree. The penalty for manslaughter in the first degree is five to twenty years, but Mueller having a prior conviction for the same offense in 1912 was sentenced under the Habitual Criminal Act to a double penalty.

Mueller, seventy-one years of age, had his license to practice medicine revoked by the Minnesota State Board of Medical Examiners in December, 1930, because of his habitual indulgence in the use of morphine. Mueller continued to violate the law by maintaining an office on South Ninth Street in Minneapolis, and at the time of his arrest he was maintaining an office at 1025 Nicollet Avenue, in Minneapolis, where a sign on the door read "Dr. Philip Mueller, Medician."

Mueller was tried for manslaughter in 1931 but the jury disagreed. In the present case Mueller performed an abortion upon a twenty-four year old St. Paul woman on November 25, with death resulting on November 27. Mueller was arrested on December 7, and nine days later was received at the State Prison.

The State Board of Medical Examiners acknowledges the splendid coöperation of the County Attorney's office in Minneapolis under Mr. Goff and the County Attorney's office in Saint Paul under Mr. Kinkead; also the splendid work on the part of the Coroner's office under Dr. Ingerson and the Saint Paul Police Department under Thomas E. Dahill, Chief of Police.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

The following excerpts are selected from two of the many important papers presented at the State-wide Medical Economics meeting held under the auspices of the Minnesota State Medical Association and sponsored by the Hennepin and Ramsey County Medical Societies Sunday, December 18, in Minneapolis.

F. S. Chapin, Chairman, Department of Sociology, University of Minnesota:

"Why was this survey (of the Committee on the Costs of Medical Care) made? It was made to discover the main facts and the scope of the crisis that now faces the medical profession. As you all know, this crisis is not a mere "psychological" crisis. It is a grim, realistic situation.

"What the Committee tried to do and what it has done is to present a challenge to the American people as well as a summons to the medical profession to give an accounting! Judging by what I hear and what I have read, the medical profession appears to be aroused. I hope this is true, since, if true, it shows that you are in a healthy emotional condition. No profession or group can maintain itself in this changing world if it complacently persists in obsolete forms of social organization. All about us today is the wreckage of banks, business firms, and other enterprises whose leaders were complacent yesterday and followed outworn forms of business organization to a certain doom. . . .

"The minority report, recommending the trial of county and state medical societies as agencies of studying and planning has the merit of utilizing existing machinery. . . . But when the minority report commends a careful trial of 'method that can be rightly fitted into our present institutions and agencies without interfering with the fundamentals of medical practice,' I venture to hope that the mention of 'the fundamentals of medical practice' has reference to scientific technics, an indispensable and justifiable limitation, and does not have reference to the present organization of medical care which is far less well developed than the science of medicine. . . . If, however, the minority intended to mean that the present organization of medical care is a sacred system not to be tampered with, then I emphatically disagree. In fact, I am disposed to issue a warning. No minority is in a position to direct the course of social change to meet its own purposes, natural as such a desire is. One only needs to remind you of the importance of certain so-called master minds of big business and big politics before recent tornadoes of social force. The reasons why the choice does not rest with certain well-intentioned but misguided authorities is that, as individuals we are all helpless before certain basic social changes. . . .

"Our salvation lies in creating a social organization tough enough to resist violent changes and yet sufficiently flexible to admit of some degree of guidance and accommodation. Hence, my reason for not accepting Dr. Fishbein's contention that the report of the Committee proposes a plan that will lead to revolution. Gentlemen, the shoe is on the other foot! If an over-conservative policy of undue resistance to inevitable social changes is adopted, then indeed, you may expect a revolution about which there will be no mistake. It may be more nearly in the nature of an explosion."

From Dr. F. E. Harrington, City Health Officer, Minneapolis:

"I find no real grounds for alarm in the report of the Committee on the Costs of Medical Care. I refer, of course, to that part of the report recommending that preventive medicine become the duty of the official health agency. The administration of preventive inoculations and vaccinations is still a medical function, and it must be insisted that such administrations be at the hands of the medical personnel. If such a recommendation is considered seriously or even adopted, no community need concern themselves with it if their public health officer makes it his business to see that this function is exercised by the medical fraternity of the community.

"We hear a great deal today about the free treatment of patients able to pay in whole or in part for the care or treatment they need. As long as the medical fraternity permits public and tax supported agencies to conduct free clinics in all branches of medicine and surgery, just so long will there be the fear that persons able to pay their physician are receiving their clinical aid at the expense of the State. Until medical societies are prepared to establish and operate free or charity service for the worthy poor, public institutions must carry on this work."

OBITUARY

Le Roy Brown
1855-1932

Dr. Le Roy Brown was born February 24, 1855, at Nankin, Michigan. He was the son of Reuben J. Brown and Betsy Ann Kingsley, both of whom were descended from Revolutionary War veterans.

He attended common and high school in Michigan and was graduated from the Michigan State Normal School at Ypsilanti in 1878, after which he taught school in California for three years.

As was the custom at that time, he "read medicine" and assisted in the office of Dr. Brekke of Ann Arbor, Michigan, for a year in preparation for his work at the Medical School of the University of Michigan from 1882 to 1885, when he received his M. D. degree. He took postgraduate and hospital work at the University of Chicago. In 1886, he came to Saint Paul, Minnesota, and practiced medicine there continuously except for a few years before 1898 when he practiced at Windom, Minnesota, and then at Heron Lake, Minnesota. He served as a medical fellow at the City and County Hospital in 1898. He was associated with Dr. Schadle in the nose and throat work of the Saint Paul Free Dispensary for a number of years, and later was in charge of that department. From 1916 to 1928 he served as a police ambulance surgeon.

In 1887, Dr. Brown married Miss Mina Allen at Ann Arbor, Michigan. To this union were born three sons and three daughters, one son and two daughters surviving. Mrs. Brown died May 7, 1909.

Dr. Brown was a prominent member of the I. O. O F. and Masonic lodges, holding various offices.

He died Tuesday, November 22, 1932, after a long illness following a cerebral hemorrhage. His funeral was held at the Masonic Temple under the auspices of the Scottish Rite Masons, with Dr. Harry Noble Wilson of Central Presbyterian Church as the officiating clergyman. Interment was in Forest Cemetery.

Arthur J. Dohm, M.D.

Catherine A. Burnes
1849-1932

Dr. Catherine A. Burnes, eighty-three, one of the first women to get a medical degree at the University of Minnesota and the first practicing physician in Hopkins, died Saturday, December 10, 1932, at the home of her sister, Mrs. Diana B. Campbell of Hopkins.

Dr. Burnes, a resident of Hopkins since 1854 when she came there with her parents, Mr. and Mrs. George M. Burnes from Tauton, Mass., entered the University of Minnesota where she received her academic degree with the class of 1879. She later became a trained nurse and received her medical degree in 1885. Her practice at Hopkins extended over a period of thirty years.

She was an active member of the Women's Republican club of Minneapolis and the Auxiliary of the Shriners' hospital. Besides her sister, Mrs. Campbell, she is survived by a foster sister, Mrs. David C. Johnson of Great Falls, Mont.

Sheridan Grant Cobb
1862-1932

Sheridan Grant Cobb was born at Cascade, Olmsted County, Minnesota, on August 14, 1862, and died in St. Paul, of pernicious anemia, on November 18, 1932, in his seventy-first year.

He was of English ancestry and a direct descendant of one of the pilgrims who came to America in the Mayflower.

Dr. Cobb received his academic education in the Cascade township district schools and at Prof. Miles' Academy at Rochester. His medical education was gained from the Hahnemann Medical College in Chicago, from which institution he graduated in 1884, supplemented by post graduate study in the New York Polyclinic in 1894, the Chicago Clinic in 1898 and the clinics of London, Paris, Vienna and Berlin in 1900.

Dr. Cobb practiced as a student under Drs. I. N. Westphall at Watertown, S. D., and P. H. Denninger, at Faribault. After graduating from medical college he practiced at Plainview, Minnesota, from 1884 until 1889, when he located permanently at Merriam Park, St. Paul.

In 1902 he founded the Cobb Hospital which functioned until 1920 when it was taken over by the N. W. Baptist Hospital Association, in the development of the present Midway Hospital.

Because of failing health Dr. Cobb retired from active practice in 1927. He was an active Mason, having been a past master and one of the founders of Triune Lodge, the Masonic lodge of Merriam Park; a thirty-second degree Mason; a Knight Templar; a Shriner; and a patron of the Eastern Star. He was a Universalist in belief but a member, with his family, of the Olivet Congregational Church, a member of the Kiwanis Club, the American Institute of Homeopathy, the Ramsey County and Minnesota Medical Societies, and the American Medical Association.

On June 30, 1886, Dr. Cobb was married to Miss E. Melicent Cutter of St. Charles, Minnesota, who survives him. He had two children, Francis C. of New Jersey and Mary, Mrs. Geo. E. Wells, Jr., of St. Paul.

Dr. Cobb had an unusually attractive personality and enjoyed a large practice and a devoted following.

Pioneering in a virtual prairie, he played a very important part in its development into an industrial center. Starting out with a monopoly in the medical work of the district, he did not stagnate under it but was always abreast of the times. His office was exceedingly complete when very few offices were. As surgeon for the Minnesota Transfer and ten associated transcontinental railways, as well as most of the industries of the Midway district, he did much traumatic surgery and was making use of physiotherapy in the rehabilitation of these cases years before such measures were in common use. He always had some of the younger men working with him and a dozen or more successful physicians of today began their careers in his office.

For his genial personality, his ability, his industry, his vision and his devotion to the interests of Merriam Park he will long be remembered.

C. V. Page
S. E. Stinnette,
H. O. Skinner,
Chairman

Franklin A. Dodge
1862-1932

On December 6, 1932, Dr. Franklin A. Dodge, a practicing physician at Le Sueur for forty-six years and well known throughout the state for his sterling qualities, passed away.

Born at Beetown, Wisconsin, October 11, 1862, the son and grandson of physicians, Dr. Dodge received his early education in the Grant County schools. In 1880 he went to St. James, Minnesota, where he worked a short time in a drug store before taking up the study of medicine at the Minnesota College Hospital and later at the Medical School of the University of New York, where he graduated in 1886.

Opening an office at Le Sueur with his brother, Dr. William Dodge, in 1886, Dr. Franklin Dodge was active

in practice until his death. He joined the Minnesota Valley Medical Society in 1886, six years after the society was founded. Four years later the Society became the Southern Minnesota Medical Association. Dr. Dodge served as president in 1915. For twenty-seven years, from 1903 to 1930, he served as Councilor for the Fourth District of the Minnesota State Medical Association. He was also a member of the Nicollet Le Sueur County Medical Society, the Minnesota State Medical Association and the American Medical Association.

In December, 1890, Dr. Dodge married Miss Alma Poehler of Henderson, Minnesota. Of their two children, Harold and Emilie, one survives. The son died several years ago. His wife passed away last year. Of the three sisters and seven brothers, Dr. Dodge survived all but one brother, John, of Woonsocket, South Dakota.

Besides his medical affiliations, Dr. Dodge took an active part in local social and business activities. He was a member of various lodges and social organizations, having been a Mason, and was president of the Farmers' State Bank of Le Sueur.

The following reference to Dr. Dodge, the man, in the local press, well expresses the esteem in which he was held by all:

"Slow in his decisions, fair in his judgments, he was loved and respected by all who knew him. No man or woman was too humble for his kindness and consideration. Rich or poor, high or low in station to him, all men were created equal, and he showed no discrimination."

C. A. Hegge

1866-1932

Dr. C. A. Hegge, who practiced medicine in Austin, Minnesota, for thirty-six years, died Wednesday, December 14, 1932, at his home in La Feria, Texas. While living in Austin, he practiced with his brother, Dr. O. H. Hegge, both of whom are widely known in Southern Minnesota and Northern Iowa. His brother still resides in Austin. Dr. Hegge left Austin four years ago to live on a fruit ranch in Texas.

William H. Magie

1854-1932

Final rites for Dr. William H. Magie, aged seventy-eight, one of the foremost surgeons of the state, and a pioneer figure in medical circles at the Head of the Lakes who died December 11, 1932, at the Restorium after a three years' illness, were held December 13.

Born in Madison, N. J., Dr. Magie was educated at the St. Louis Medical College, St. Louis, Mo., and later took a post-graduate course at Columbia University, New York, and at Rush Medical College, Chicago. He came to Duluth in 1881 from Pittsburgh, Kan., and with Dr. S. H. Boyer, began his practice in the West End.

When the Lyceum Building was constructed, they opened offices in it, and for many years he was surgeon for all railroads, lumber and mining companies operating in that district. He served the old Saint Paul & Duluth road, the Duluth & Winnipeg road, the Duluth, Missabe & Northern, and others. Later he headed the Morgan Park Hospital for the Minnesota Steel Corporation.

Dr. Magie was one of the first staff physicians of St. Mary's Hospital, and remained a member of the staff until his death. He made medical history in the early days of Duluth, and from records at St. Mary's Hospital, performed the operation for the first properly diagnosed case of appendicitis in Duluth. In 1885 the records show he performed the first "gastro-enterostomy" in Duluth. He gained a wide reputation as a surgeon.

Records also show that he was an indefatigable worker and during epidemics of 1895 and 1897 he worked night and day.

Dr. Magie was a fellow of the American College of Surgeons, a member of the Western Surgical Association and the American Medical Association, and a former president of the Minnesota State Medical Association and of the St. Louis County Medical Society.

Following the death of his first wife a number of years ago, he married Miss Isabella Henry, who died three years ago. He is survived by a son and daughter, Woodbury W. Magie, Saint Paul, and Mrs. Frank Stauduhar, Duluth, children of his first marriage, and two sons, William H., Jr., and John Corbett Magie, both of Duluth, children of his second marriage; two sisters, Mrs. Aura Roderick and Mrs. Parthena Tohama, both of Pittsburgh, Kan., and two brothers, Frank L. Magie, former St. Louis County sheriff, and Alfred Magie of Pittsburgh, Kan.

Irwin A. O'Connor

1898-1932

Dr. Irwin A. O'Connor, Saint Paul physician, died Sunday night, December 25, 1932, in his home, following a week's illness.

Dr. O'Connor, thirty-four years old, was born in Marysburg, Minn., and had lived in Saint Paul for thirty years. He was graduated from the University of Minnesota Medical School in 1922. He was in private practice with offices in the Moore Building.

Dr. O'Connor was a member of Alpha Kappa Kappa, medical fraternity, the Knights of Columbus, the Ramsey County Medical Society, and the Minnesota State Medical Association. He was on the staff of St. Joseph's and Midway Hospitals. His wife, the former Anne Deegan of Saint Paul, died in March, 1930.

Dr. O'Connor is survived by his mother, Jennie M. O'Connor; a son, John, and a sister, Mrs. Inez Sitzmann, all of Saint Paul.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of January will be as follows:

January 4—Mitral Stenosis.
January 11—Carbon Monoxide Poisoning.
January 18—What is Hyperacidity?
January 25—Ovarian Tumors.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The American Association for the Study of Goiter, for the fourth time, offers Three Hundred Dollars ($300.00) as a first award, and two honorable mentions for the best three essays based upon original research work on any phase of goiter presented at their annual meeting in Memphis, Tenn., May 15, 16 and 17, 1933. It is hoped this will stimulate valuable research work, especially in regard to the basic cause of goiter.

Competing manuscripts must be in English and sub-

nitted to the Corresponding Secretary, J. R. Yung, M.D., 670 Cherry St., Terre Haute, Indiana, U. S. A., not later than April 1, 1933. Manuscripts arriving after this date will be held for the next year or returned at the author's request.

J. R. Yung, M.D.,
Corresponding Secretary.

THE STATE MEETING

Plans for the 80th Annual Meeting of the Minnesota State Medical Association to be held at Rochester, May 22, 23, and 24, are already taking substantial form, according to members of the Committee on Scientific Assembly.

The Committee met for the first time in Saint Paul Saturday, November 26, to determine the general character of the meeting which, following the precedent set in Saint Paul last year and the trend of medical meetings everywhere, is to be confined very largely to small group sessions. The demonstrations for small groups which distinguished the Saint Paul meeting, together with three afternoons of clinics, utilizing the extraordinary facilities available in Rochester, are expected by the committee to make the 1933 meeting outstanding in the history of the Association.

The fact that seventeen out of thirty-five available spaces for commercial exhibits are already sold, as reported by Dr. E. A. Meyerding, Executive Secretary, in charge of business management of the meeting, is regarded as an interesting index of the importance of the Minnesota meeting in the minds of exhibitors. These spaces were sold within a few hours after the letters of announcement went out. The unusual interest shown by commercial firms is expected to find its counterpart in the interest of the profession itself, both locally and outside the state.

Present plans call for a series of open meetings, morning and afternoon, of the specialized societies of the state. The programs for these meetings will be arranged by the societies to be of interest to specialists and general practitioners alike. Among the societies that have already agreed to arrange programs are the Trudeau Society, Surgical Society, Heart Association, Urological Society, Northwestern Pediatric Society, Minnesota Society of Neurology and Psychiatry, and Minnesota Academy of Medicine.

The table demonstrations that featured last year's meeting will be repeated and enlarged for the 1933 meeting. They will be held between 10 and 11 A. M. Monday, Tuesday, and Wednesday. The early hours of Tuesday morning will be devoted to a symposium on Nutritional Disorders according to present plans, with general meetings, between 11:00 and 12:00, and 1:00 and 2:00 P. M., at which guest speakers will deliver their papers. Wednesday morning's program will be devoted chiefly to subjects voted upon by the membership of the Society, cards having gone out shortly after the November meeting of the Committee for all members to check.

The most frequent choices thus far indicated in the cards returned to state headquarters are for various phases of the nutritional disorders already chosen as subject of Tuesday morning's symposium; also the injection treatment of hernia. This latter and other choices will appear on Wednesday morning's program.

The clinics to be arranged for each afternoon will undoubtedly prove to be the outstanding feature of the meeting. A minimum of forty clinics will be held each day, utilizing all of the extraordinary facilities and talent available at Rochester.

A medical economics meeting at which Olin West, General Manager of the American Medical Association, and Morris Fishbein, Editor, will speak, is scheduled as usual for Monday night. Fraternity luncheons, the annual golf tournament, and the annual banquet will take the lead among social events of the three days.

The Council and the House of Delegates of the organization will begin their deliberations Sunday with the House of Delegates meeting for the first time Sunday night.

MEDICAL ECONOMICS MEETING

Called by N. O. Pearce of Minneapolis, who took office January 1 as president of the Minnesota State Medical Association, chairmen of all standing committees of the state society met at luncheon Sunday, December 18, preceding the afternoon's medical economics meeting at the Nicollet Hotel.

This meeting followed a precedent set by M. S. Henderson, retiring president, who called his committee chairmen together for monthly meetings during most of his term of office.

Each chairman outlined the work of his committee at the Sunday meeting and its plans for the coming year. Present were Dr. Pearce, presiding officer and chairman of the University Relations Committee; H. M. Johnson, Dawson, chairman of the Committee on Public Policy and Legislation; George Earl, St. Paul, chairman of the Committee on Public Health Education; T. H. Sweetser, Minneapolis, chairman of the Committee on State Health Relations; S. R. Maxeiner, Minneapolis, chairman of the Radio Committee; W. H. Hengstler, St. Paul, chairman of the Committee on Medico-Legal Affairs; F. L. Smith, Rochester, chairman of the Committee on Military Affairs; A. S. Hamilton, Minneapolis, chairman of the Historical Committee; W. L. Burnap, Fergus Falls, chairman of the Committee on Public Health Nursing; Leo Rigler, Minneapolis, chairman of the Committee on schools for Laboratory Technicians; J. S. Reynolds, Minneapolis, chairman of the Editorial Association Committee; J. O. Taft, Minneapolis, chairman of the newly formed Committee on Inter-Professional Relationship and F. R. Huxley, Faribault, second vice president of the state society.

Doctors S. B. Solhaug (chairman of the Committee on Hospitals and Medical Education), Earl, Hirschboeck (chairman of the Heart Committee), Burnap, Reynolds and Taft are this year's appointees. The Inter-Professional Relationship Committee newly created by the Council this year, is designed to foster and cement proper relationships between the medical and allied professions, particularly the profession of pharmacy.

More than 50 persons, most of them physicians from all parts of the state, attended the meeting called by M. S. Henderson, president of the Minnesota State Medical Association for Sunday, December 18, at the Nicollet Hotel, in Minneapolis, to consider the Majority and Minority Reports of the Committee on Costs of Medical Care.

The interest of everybody in the medical economic questions discussed was evidenced by the absorption with which they listened to the sixteen distinguished speakers, from 2:30 in the afternoon to nearly 10:30 that night.

The program was arranged to give expression to every informed and interested point of view. It began with a sketch of the economic activities and problems of the profession in Minnesota by E. A. Meyerding, secretary of the State Association and got under way pointedly with a direct and uncompromising exposition of the attitude toward the whole question of a University layman and sociologist, F. S. Chapin, Ph.D., chairman of the Department of Sociology of the University of Minnesota. Dr. Chapin, at the instance of the program sponsors, did not hesitate to express an opinion opposed to those of the majority of his audience and the wisdom of placing him upon the program early was evidenced in the warmth and earnestness

which characterized the expression of counter opinion by other speakers on the program.

E. H. Cary of Dallas, president of the American Medical Association, Olin West of Chicago, Secretary, and C. B. Wright, chairman of the Legislative Committee, represented the American Medical Association and its points of view which coincided substantially with the representatives who spoke for the local medical profession.

C. E. Rudolph, professor of oral anatomy at the University School of Dentistry and signer of one of the minority reports definitely favoring compulsory health insurance and a socialization of medicine was present to express the feeling of his co-signing members of the Committee on the Costs of Medical Care. The city and state departments of health, the hospital association and the University medical school were also represented. The sum total of all of the discussion successfully conveyed a picture of the conflicting opinions and problems entering into the current situation.

The complete list of speakers included Doctors E. A. Meyerding, E. H. Cary, Chapin, C. E. Rudolph, Olin West, C. B. Wright, M. S. Henderson, N. O. Pearce, R. E. Scammon, F. E. Harrington, J. A. Thabes, Sr., H. M. Johnson, L. R. Critchfield, George Earl, Theodore Sweetser, and Mr. A. M. Calvin, superintendent of the Mounds Park and Midway Hospital.

Selected representatives of the dental and hospital associations, University medical students, nurses and the Women's Auxiliary, also attended.

Meetings of the Council of the State Association and of the State Health Relations and the Public Health Education committees and the Committee chairmen preceded the afternoon meeting.

On Monday, December 19, Dr. Cary and a party of Sunday's speakers, including Dr. Meyerding, Dr. Pearce, Dr. Wright and Dr. Scammon went to Rochester to speak before a group of Southern Minnesota physicians at Plummer Hall. This meeting was a medical economics meeting, likewise arranged by Dr. Henderson to reach physicians at a distance from the Twin Cities.

RED RIVER VALLEY SOCIETY

The following officers of the Red River Valley Medical Society were elected for 1933: H. H. Hodgson, Crookston, president; O. E. Bratrud, Thief River Falls, vice president; C. L. Oppegaard, Crookston, secretary-treasurer; A. M. Smith, Thief River Falls, censor, and H. M. Blegen, Warren, and O. E. Locken, Crookston, delegates.

RICE COUNTY SOCIETY

J. M. Murdock, Faribault, president of the Rice County Medical Society, entertained the members of the society at a dinner meeting at the Hotel Faribault, Wednesday, December 14, 1932.

Following the dinner, C. N. Spratt of Minneapolis gave an illustrated lecture on "Eye Operations," and W. R. Webb, also of Minneapolis, talked on "Drainage in Appendicitis." New officers elected were: Dr. Murdock, president; M. L. Mayland, Faribault, vice president; C. J. Planske, Faribault, secretary-treasurer; Adolph M. Hanson, Faribault, delegate; F. J. Lexa, Lonsdale, alternate; Dr Mayland, S. B. Haessley, W. S. Nickerson, all of Faribault, censors, and W. H. Rumpf, Dr. Haessely of Faribault and Joseph Moses, Northfield, publicity committee. C. A. Rohrer of Waterville and R. J. Wilkowske of Nearstand were elected to membership in the society

STEARNS-BENTON SOCIETY

J J. Gelz, St. Cloud, has been elected president of the Stearns-Benton County Medical Society; Charlotte A. Stickney, St. Cloud, vice president; J. N. Libert, St. Cloud, Secretary; F. J. Schatz, St. Cloud, treasurer; J. P. McDowell, St. Cloud, delegate and C. A. Rathbun, St. Cloud. alternate.

WASHINGTON COUNTY SOCIETY

R. J. Josewsky, Stillwater, is to be 1933 president of the Washington County Medical Society. George F. Brooks, Marine-on-St. Croix, is first vice president; J. A. Poirier, Forest Lake, second vice president; E. S. Boleyn, Stillwater, secretary-treasurer; Dr. Boleyn, delegate; W. R. Humphrey, Stillwater, alternate, and J. W. Stuhr, Stillwater, censor.

PROCEEDINGS MINNESOTA ACADEMY OF MEDICINE

Meeting of November 9, 1932

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, November 9, 1932. Dinner was served at 7 p. m. and the meeting was called to order at 8 p. m. by the President, Dr. J. C. Litzenberg.

There were thirty-eight members present.

Minutes of the October meeting were read and approved.

There was no business meeting, and the scientific program was as follows:

A CASE OF RUPTURED KIDNEYS

Dr. A. E. Wilcox: The patient was a female, aged twenty-six, who was injured in an automobile accident October 30, 1932. She was thrown through the windshield of the automobile in which she was riding when the car struck a tree stump. The patient was not completely unconscious but was dazed and in traumatic shock when she was observed immediately upon being admitted to the General Hospital Emergency Department. The following day she was transferred to Asbury Hospital, at which time she was suffering from lacerations of the head and face and general body contusions most marked on the left side. She also complained of severe pain in the left lower thoracic region and adjacent lumbar and abdominal areas.

In addition to the lacerations, the positive findings upon admission were marked tenderness and rigidity in the left loin and left upper and middle portions of the abdomen. The blood pressure was noted to be 100/40, and temperature 102°. The following morning her temperature was 100.2° and she seemed better. However, the urine showed 3+ albumin and many red blood cells. The hemoglobin was 71 per cent, erythrocytes 2,500,000, and leukocytes 22,200.

Forty-eight hours later, following a severe chill, the patient's temperature rose rapidly to 106.3°. She was given morphin and 3,000 c.c. of salt solution by hypodermoclysis, and the temperature dropped to 99.6°.

A flat plate of the abdomen was made which showed a diffuse shadow on the left side obscuring the left psoas muscle; the right, in comparison, being quite clear. A few red blood cells persisted in the urine and the local symptoms of pain, tenderness and rigidity became more marked in the left upper abdominal quadrant and through the lumbar region.

Cystoscopic examination showed normal urine from the right side, and no secretion from the left. The left ureteral opening was reddened and swollen and the mucous membrane around the opening was markedly injected and some exudate was present.

Following the cystoscopic examination the left loin was explored under spinal anesthesia. The usual curved

kidney incision was made and, upon reaching the perirenal tissues, results of marked and diffuse hemorrhage were noted. The retroperitoneal space was filled from the diaphragm down to the pelvis with coagulated blood, and when the kidney was isolated free bleeding from parenchyma was observed. The pedicle of the kidney was rapidly isolated and clamped en masse and the kidney removed.

Examination of the specimen presented shows a rupture of the lower pole and complete tearing and division of the ureteropelvic junction. The upper end of the lower portion of the ureter was not located.

Appropriate drainage was instituted and the wound was closed with through-and-through sutures. Immediately following the operation, 500 c.c. of blood was obtained from matched donors and transfusion by the citrate method instituted. A reaction with temperature of 103.8° ensued, followed by gradual recession. On the fifth postoperative day the temperature was 100.2°, pulse 104. The patient's general condition is good at the time of this report.

(Subsequent note: The patient left the hospital Dec. 1, with the wound still draining, but condition much improved.)

DISCUSSION

Dr. Oscar Owre (Minneapolis): We encounter quite a number of these injured kidneys at the General Hospital and often the patient is in such a critical condition that cystoscopic examination cannot be performed. In these cases the intravenous administration of Skiodan assists us in making a very early diagnosis. Sometimes if the ureter is badly injured or completely severed, the urine after a short time becomes clear owing to the fact that the urine is being secreted into the tissues outside of the kidney and not into the bladder. Then if we measure the amount of urine passed it will be found to be approximately only half of the usual total with a palpable tumor mass in the loin of the injured side which increases in size and is painful on palpation. Here again the dye will be seen on X-ray films to be passing into the tissues outside the kidney.

Dr. C. N. Hensel (St. Paul) presented his Thesis entitled "Pitfalls in Cardiac Diagnosis" (to appear at a later date in Minnesota Medicine).

Dr. H. L. Ulrich (Minneapolis): I wish to congratulate Dr. Hensel on his fine review of the problems of the cardiopath. Fifty per cent of the patients who come to us complaining of heart symptoms have no heart disease whatever. One of the simple rules of procedure in cases where there is true valvular defect is: if there is no response to rest and digitalis, there is some complication superimposed on the situation. In valvular defects, particularly mitral disease, one of the most common complications of this nature is hyperthyroidism. Hypothyroidism is encountered sometimes but it is not so prevalent. We have been able after years of experience to quite accurately diagnose the thyroid heart—the heart which is whipped up by a high metabolic rate. There are, however, instances in this group of certain cases that come to us in a decompensated state in which the hyperthyroid disease is overlooked and these go on to exitus in spite of our attempts at therapy. I have seen instances in which hyperthryoidism was even suspected and Lugol's administered without success. At postmortem nothing was found in the heart except some hypertrophy. The thyroid, however, showed hyperplasia or adenoma. One ought to examine the thyroid more closely in cases where there is no response to therapy, and surgery should be gravely considered in spite of the decompensation.

In the group that have valvular defect with hyperthyroidism, the differentiation is not so clear in the minds of clinicians. A goodly number are what we call the larval type. There is no other evidence of hyperthyroidism, the only evidence being a heart which may exhibit total irregularity or a rapid regular rate and in which there is no response to the usual therapy. Quite commonly there is no associated increased metabolic rate. Here careful palpation of the thyroid is indicated. One can often detect adenoma. That type of case is also a surgical problem.

The other point which Dr. Hensel made, the psychoneurotic, is a clinical problem which can only be handled by experience. Of course there are other pitfalls in the diagnosis of heart disease; I mean real heart disease, which he has not touched upon. But we arre not discussing these because they are only of academic interest.

Dr. C. N. Spratt (Minneapolis) showed moving pictures of (a) Cataract Extraction (pocket flap method); (b) Glaucoma Sclerecto-Iridodialysis; (c) Enucleation with Fat Implant; and (d) Magnet Operations.

DISCUSSION

Dr. Spratt: Dr. Brown suggested the possibility of tearing the conjunctival flap. Old people, especially those reduced in weight, may have a fragile conjunctiva. The use of the blunt forceps rather than a mouse tooth, and a round needle rather than the ordinary cutting needle, will obviate this difficulty. Should the conjunctiva be torn, enough of the flap remains to secure a strong wound. Certainly a much firmer and better apposition can be secured than by the ordinary incision made in the cornea or limbus.

It is not difficult to do this operation although it seems so from looking at the pictures. The knife is inserted in the pocket, the flap is turned up and there is perfect visibility in making counter puncture. My object in doing this operation with this flap is that the factor of safety is tremendously increased by the suture of the conjunctiva. The possibility of infection is reduced and the period of convalescence is shortened. Very few patients are kept in bed over twenty-four hours and most of them leave the hospital inside of a week.

There is slightly more bleeding with this type of operation but, due to the fact that the posterior capsule is in place, this blood is confined in the anterior chamber and is soon absorbed.

The meeting adjourned.

R. T. LaVake, M.D., *Secretary.*

TRANSACTIONS MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD OCTOBER 6, 1932

The President, Dr. Kenneth Bulkley, in the Chair

RETROPERITONEAL MYXOLEIOMYOMA

Dr. Martin Nordland reported a case of retroperitoneal myxoleiomyoma in a man twenty-six years of age, with operation and pathological report. (Full report of this case is published in Minnesota Medicine, November, 1932, Vol. 15, page 779.)

Dr. J. Frank Corbett recalled a case he had seen a good many years ago. The location of the tumor was lower down than the one described; it was over the lumbar vertebræ, and the predominant symptom was persistent pain in the rectum. Several proctoscopic examinations were made and nothing found, until finally some one felt the tumor. It was much more firm and hard than this one reported by Dr. Nordland. The man died and at autopsy it was found that this tumor had invaded the spinal canal. Another case, which

bears no relation to this one, occurred when Dr. Corbett was doing pathological work; it was a retroperitoneal tumor which he examined for Dr. Sweetser. On examination of sections, he was somewhat confused as to just what the tumor was. As a matter of fact, the whole thing disappeared under antisyphilitic treatment, only a part of the tumor having been removed at operation.



Fig. 1. Before reduction.



Fig. 2. After reduction.

Dr. S. H. Baxter stated that several years ago he presented before this Society a report of two cases of retroperitoneal tumor, with an analysis of about two hundred cases which, up to that time, had been reported in the literature. If Dr. Nordland had added a few more titles to the name of the tumor so as to include all the histological classes of tissue found in the body, the name would have given a composite picture of retroperitoneal tumors in general, for they are found in a region in which embryonal rests are prone to occur and in which any type of tissue may be found. In the study which Dr. Baxter had made, the vast majority of these tumors were found to be malignant, either inherently or by reason of their histological structure; or malignant in the sense that, regardless of their structure, they kill the patient by process of slow exhaustion. Diagnosis before operation is seldom made, usually for the reason, as confessed by Bettman in a paper published about the same time, that the possibility of this condition was not kept in mind. One of the cases which had been reported by Dr. Baxter was regarded as an ovarian cyst, an opinion which was concurred in by the late Dr. A. W. Abbott. This is a very common mistake, for the consistency of the tumors is such that they are semifluctuating and closely resemble the "feel" of an ovarian cyst. Aside from their interest histologically, their anatomical relations and the practical surgical problems in connection with their removal make them interesting. Lantern slides illustrating these points were shown by Dr. Baxter.

The attention of the Society was called to the collection of lantern slides which is being made by the Library of the Hennepin County Medical Society. This will be cross-indexed and made available for the use of the members of the Society. It is hoped that in time a comprehensive collection covering all phases of Medicine and Surgery will be accumulated and the members of this Society are urged to help by contributions of slides which would otherwise be lost or would be lying around in desk drawers gathering dust.

REDUCTION OF COMPRESSION FRACTURE OF BODY OF FIRST LUMBAR VERTEBRA ON A GATCH BED

Dr. R. C. Webb stated that compression fractures of the bodies of the vertebra were becoming increasingly common and that the upper lumbar vertebræ were most commonly injured. The Potter Bucky diaphragm during the past fifteen years has improved the X-ray diagnosis of these fractures and lateral view X-rays are now almost routine practice among surgeons and roentgenologists. With the standardization of the diagnostic procedures in this type of fracture it was but natural that improvements in treatment would shortly follow. Davis, of Erie, Pennsylvania, a few years ago demonstrated a method of reduction of these fractures by manipulation under anesthesia. Although Davis' method was efficacious it was considered to have possibilities of danger and it was soon followed by a method of gradual reduction over a special frame designed by Rogers of Boston. Rogers' frame was arranged so that it could be placed on the bed and flexed convexly upward under the damaged vertebra. Herzmark devised a similar Bradford type of frame which also could be flexed convexly and Conwell has modified this frame.

Dr. Webb reported the case of a man in his forties who had fallen from a sixteen-foot height and had broken both legs. There were no complaints about his back, but a careful history as to the manner of falling led him to believe that a fractured lumbar vertebra should be ruled out. A lateral view X-ray of the spine revealed a compression fracture of the first lumbar vertebra, the vertebra presenting a wedgelike appearance (Figure 1). The patient was admitted to the Asbury Hospital one week after injury and one of the fractured legs was operated upon under ether anesthesia eight days after injury. One of the legs was placed in molded plaster splints and the other was suspended in a Thomas splint with a Pearson attachment.

The problem of treatment of the fractured vertebra under these circumstances was considered and he de-

cided to place the patient in an ordinary hospital bed with the Gatch type of flexible springs such as is used by surgeons in obtaining the Fowler position for the treatment of peritonitis. On this bed the head of the

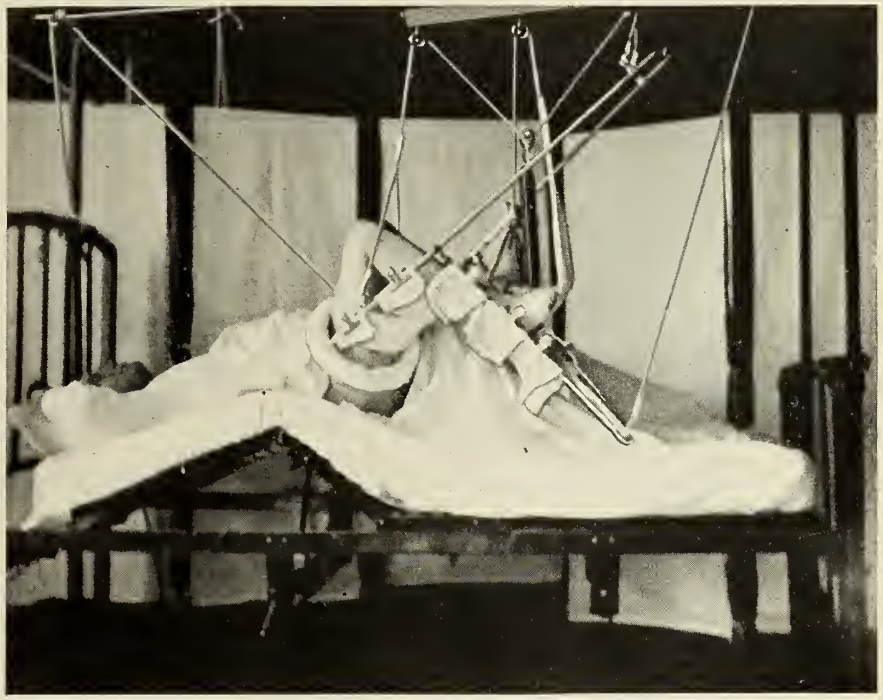


Fig. 3. Gatch bed.

spring can be elevated to elevate the patient's trunk and the remainder of the spring can be flexed upward under the knees. When the spring is lifted from the bed and reversed, the portion which flexes upward under the knees comes up under the upper lumbar vertebra.

When the operation on the leg was completed the anesthesia was continued until the patient was placed on this reversed Gatch bed and the spring was flexed to a height of twelve inches, which is its maximum (Figure 3). The patient remained on this bed and forty-eight hours later Miss Mary Bell, X-ray technician at the Asbury Hospital, succeeded in getting a very satisfactory lateral view of this vertebra with a portable X-ray showing the compression fracture of the first lumbar vertebra reduced, as illustrated in the X-rays shown at this time (Figure 2).

Because of the fractures in both legs the patient remained on this bed for three months with moderate elevation of the bed under his first lumbar vertebra.

Dr. E. C. Robitshek asked how long a patient should be kept in position on the Gatch bed.

Dr. Webb replied that the patient was kept at the maximum elevation for four days, at the end of which time the reduction was thought to be as near as possible to the maximum, then the elevation was decreased to about six inches and this was maintained for three months because the injured legs required three months in bed. Dr. Webb stated he had used this method of reduction and treatment on three cases and he had persuaded a colleague to use the method on a fourth patient with satisfactory results.

Dr. R. F. McGandy asked if Dr. Webb always used an anesthetic even in those patients who are able to walk in with no back complaint.

Dr. Webb stated that, with the Davis method which had been first successfully reported locally by Evans, an anesthetic was always used. He said that Rogers of Boston, who had devised the frame, used the method of gradual reduction. Dr. Webb had used the anesthetic because the patient was already anesthetized for another reason, but he saw no reason why the same effect could not be obtained gradually by following Rogers' routine and obtaining maximum elevation in about five days, using no anesthetic.

Dr. Corbett asked Dr. Webb how long a time after placing the patient in position on this bed did he obtain results.

Dr. Webb stated that his result had been demonstrated by Miss Bell with a portable X-ray machine in forty-eight hours. With the Davis method the result is obtained immediately and Rogers, with the gradual elevation without anesthesia, obtains a reduction in about five days. In the patient reported tonight the reduction treatment had not been applied until eight days after injury but this lapse of time had apparently not interfered.

RESULTS OF THE SURGICAL TREATMENT OF INGUINAL HERNIA IN MALES

Dr. H. M. Lee read his Inaugural Thesis with the above title.

SUMMARY

1. The injection method of treatment of inguinal hernia has not yet been adequately demonstrated to be as satisfactory as the surgical treatment.

2. The average rate of recurrences following surgical treatment in the indirect hernia, even in skilled hands, is probably about 5 per cent. In the direct type it would appear that the average rate of recurrences is about 15 per cent, the highest percentage of recurrences appearing in bilateral hernia done at one sitting. The percentage of recurrences in patients over sixty years of age is much higher.

3. Approximately 73 per cent of recurrences appear within nine months; practically all of the recurrences occurring within the first year.

4. Serious complications following surgical treatment

of inguinal hernia is not high, pulmonary embolism being the most serious and accounting for approximately 50 per cent of the mortality, which is reported to be approximately one-fourth of 1 per cent. In our own series we have had no pulmonary emboli and no mortality.

5. It seems desirable, as precautionary measures, to avoid too tight dressings, to have the patient avoid assuming a stationary position for too long a period; in other words, encourage early postoperative exercise.

6. The use of fascial transplants or sutures seems only infrequently necessary.

7. A well-established technic carefully and accurately followed is of distinct advantage.

Dr. S. R. Maxeiner believed the subject of hernia is particularly interesting and extremely apropos. He had presented this subject previously and had referred to the work being done at the Government Hospital. At that time he had followed up something like 700 cases done for the government by Doctors Lee, Mann, Corbett, Brown and himself. But their inability to get a personal examination rendered their final examination work unsatisfactory. He was of the opinion that any statistics are practically valueless without personal follow-up examinations. They had written to these ex-soldiers, many of whom were drawing compensation on their hernias, and as a result many of them complained of various symptoms which might or might not be attributable to a recurrence.

The technic described by Dr. Lee was practically the same as that used in this series of hernia operations except that at that time they did not notch both layers of the external oblique. Dr. Maxeiner said he notched both layers of the external oblique in some cases where he thought it was indicated, but not routinely. It was also his opinion that the patient with the weak abdominal wall who has a scarcity of tissue for normal repair, especially in an obese man over 50, constitutes a class which gives a much greater percentage of recurrences. In such cases, one should consider McArthur's fascial suture or the use of a strong sac as suture or, in extreme cases, the use of the Galley fascial strip graft from the thigh. In the repair of a recurrent hernia, which ordinarily is apt to recur again in from 40 to 45 per cent of the cases, he feels that the fascial strip suture of Galley renders the best possible chance for permanent cure. Dr. Maxeiner stated that he had done three plastic repairs on hernias of this type without recurrence which he did not believe could have been made to remain permanently closed with any other method. In these instances he used wide belt lacing which was woven in by basket-weave type of suture, lacing the internal oblique and conjoined tendon to Poupart's ligament.

The Galley method should be seriously considered in all recurrent hernias, in Dr. Maxeiner's opinion. He also felt that all surgeons should review their own hernia cases to find out the character of their results, and if this should be done one would less often hear surgeons state that they had no recurrences following their herniotomies. Recurrences as a rule take place within two years of operation and the majority within the first six months following their repair.

Dr. Maxeiner again wished to congratulate Dr. Lee upon the excellent manner in which he had reviewed the subject and repaired his cases.

Dr. L. H. Fowler called attention to one thing which he felt was all-important but which had not been mentioned this evening, namely, the complete and careful enucleation and removal of the sac is the most important factor in the cure of an indirect inguinal hernia. He personally felt, if he had a hernia, that he would rather have the sac thoroughly removed without any repair or with only replacement of the external fascial layers, than he would not to have the sac thoroughly and carefully removed and have all kinds of repair of the wall. He cited the report of an English surgeon of over 1,000 cases in which the author did nothing but remove the sac and obtained just as good results as others who emphasize the repair of the wall.

Dr. E. K. Green reported a case where paraffin had been injected in an attempt to cure an inguinal hernia, which he had seen with the late Dr. Little some years ago. The man had a large hernia and at examination the hard tumors could be felt in the tissues about the ring. At operation they found some masses one-half the size of the fist, as well as many smaller ones. So far as Dr. Green knew, the patient made a good recovery following operation. Dr. Green asked Dr. Lee his reason for the statement that he "would not advise doing a bilateral hernia at one sitting." He felt that Dr. Lee deserves a great deal of credit for the low percentage of recurrence in his cases, due largely, no doubt, to the thoroughness of his operation.

Dr. R. F. McGandy asked Dr. Lee if in his careful review of the literature he had found the period which the patient was kept in bed after a herniotomy standardized and also whether or not this length of time in bed had any relation to recurrence.

Dr. R. C. Webb stated that two years ago, in October, 1930, he had operated upon a surgeon from another state for a bilateral inguinal hernia. This surgeon had had the courage of his convictions and had persuaded Dr. Webb to perform the operation of Russell of Australia as mentioned previously in the discussion.

The description of the operation as dictated at that time is as follows:

> "A five inch Pfannenstiel incision was made using novocaine local anesthesia and both inguinal canals were exposed. The sacs on each side were found to be about the size of a lemon but there was an additional bulging of the peritoneum just medial to the indirect hernia. The entire sacs and bulging were freed from surrounding tissues and well back into the abdomen, and were transfixed and ligated and transplanted under the internal oblique. The cords were not freed from the surrounding structures and the internal oblique and Poupart's ligament were scarcely seen and were left undisturbed. After closing the sacs the remainder of the operation consisted merely of placing a running suture in the edges of the external oblique fascia. The skin was closed with fine dermal."

The surgeon promised to report to Dr. Webb if his hernias ever recurred. It is now two years since operation and he had just recently seen him and there is no recurrence.

Dr. O. W. Yoerg asked Dr. Lee how long after having done a herniotomy can one expect a recurrence. He recalled a case he had operated several years ago and twelve years later the man developed a recurrence.

Dr. J. F. Corbett said in this connection he would simply repeat the advice he received as a student from his old preceptor, Dr. Rochford, *i.e.*, in oblique hernia, look out for the sac and get that; in direct hernia, you have to look after something more. One other point he wished to mention, *i.e.*, very little mention was made this evening of the ilio-inguinal nerve which sometimes gets caught in the stitches and gives a good deal of distress to the patient, probably sometimes recurrence.

Dr. C. G. Cottam felt that the question of recurrence is the outstanding worry surgeons have in these cases. He wondered if this might not be due, in part at least, to overlooking the pantaloon type, or, as Dr. Lee termed it, the saddle-bag type. He was of the opinion that this anomaly occurs more frequently than one may think. The deep epigastrics are frequently aberrant and it seemed to him a simple thing for the sac to press against the fold in which they travel and thus bisect the sac. He recalled a case of his own in which that happened. The patient was a doctor who came to him for operation and Dr. Cottam had done what he thought

he time was a keen job. But later the other half the pantaloon hernia was operated on elsewhere. ce then Dr. Cottam had followed the plan of putting finger into the sac and feeling around and in some es he has found the other part of the hernia. Law- Tait first advocated the repair of hernia from the de, believing that if the ring were closed and the scle left alone the hernia would take care of itself. one else seems to have had the courage to adopt procedure.

he question of complications, Dr. Cottam felt, is her a timely one. One is apt to think of a hernia a straightforward, simple thing and it usually is. t he had had a case in a 15-year old boy who had n brought in by his doctor, and on whom Dr. Cot- n had proceeded to operate in the usual manner. e reason the patient was brought in was because tenderness; the hernia itself did not bother him so ch. When Dr. Cottam operated, he found in the a rather acutely inflamed appendix which he easily noved, but he did not like the looks of the appendix d so had it examined bacteriologically and got a eptococcus. The boy did very well for a few days, d then developed a bronchopneumonia which was ought at the time to be due to ether. In due time this lminated in a subphrenic abscess and finally was ained. Dr. Cottam mentioned this because here was case of an apparently simple hernia.

In connection with the injection treatment, Dr. Cottam id he had been doing surgery long enough to recall e time when injections were in the hands of quacks d he had seen quite a bit of their work. It had ruck him as being rather an ideal way of getting rid the hernia. The injection fluid usually consisted of solution of quercus alba (white oak). In one case e hernia, which had at first been reducible, had be- me irreducible after the treatment, and the walls were und to be at least one-fourth of an inch thick at the eration. He had preserved the specimen from this eration and exhibited it at various medical society eetings. But Dr. Cottam felt that in proper hands ere is a chance for this method to amount to some- ing. Of course, the paraffin method is passé abso- tely, but this is no reason why the injection method ould be no longer used in competent hands.

Dr. Kenneth Bulkley said, in connection with the uestion of recurrence, that the entire matter had not een completely covered. It is quite possible that the bliquity of the conjoined tendon had something to o with the question of recurrence, particularly in direct ernia. With a heavy transversely placed conjoined endon, the repair of the lower portion of the new osterior wall of the canal was simple. With a poorly- eveloped and oblique conjoined tendon, it was less asy to obtain complete coverage without tension. In uch cases Dr. Bulkley had found that the method de- cribed by Blake was often of value. This consists n turning back a quadrilateral trap-door from the nterior sheath of the rectus muscle, the hinge of the loor being on the outer rectus edge and the free edge of the door being used to suture to the deep reflection of Poupart's ligament.

Dr. H. M. Lee (in closing) replied to Dr. Yoerg's question, about how long a man might be safe before recurrence, that he certainly did not know. If there is anything to trauma producing hernia, a man might be subject to that at any time after an operation as well as before. Irrespective of that, there is no time, so far as Dr. Lee knew, that the man is absolutely safe from recurrence.

Dr. Fowler spoke of taking special care of the sac, and Dr. Lee was of the opinion that all surgeons attempt to do that regardless of what type of operation is performed in these cases. In answer to Dr. Green's question as to objections to doing bilateral hernias at one sitting, Dr. Lee said in the first place one is apt to use the same gloves, gowns, drapes, etc., for the second one and there is added chance of infection. Secondly, if the structures are sutured on one side there is apt to be a certain degree of tension which the unoperated side may compensate for; but if the other side is operated at the same time, of course, there is the added strain on the sutures and tissues. Then, too, the time element, exhaustion of the patient, etc., must be considered and frequently the surgeon feels that he has to hurry and probably does not do the second as thoroughly as if doing one side only at a time. Dr. McGandy asked about the period of rest in bed in its relation to recurrences. Dr. Lee said he did not know what effect that has on the recurrence rate, although he knew that some men advocated that the patient should not be kept in bed after eight days. He himself always kept the patients in bed from twelve to fourteen days postoperative.

Dr. Lee said Dr. Webb's suggestion in regard to the running suture including the transversalis fascia was a good idea; and he felt that anything that would close the incision more completely is an admirable procedure. Also, Dr. Corbett's suggestion of the nerve supply of course is of very great importance. The ilio-inguinal and ilio-hypogastric nerves are right in the field of operation, and it is very important not to injure them, not only for their innervation of the muscles; but they are also sensory to the skin in that area. Dr. Cottam's suggestion of the importance of searching for the other sac in the saddle-back type of hernia is important, and Dr. Lee said that he had done, and he also knew that Dr. Maxeiner had been doing that for a long time. He made it a routine practice to put the finger in the open sac and search for a bulge elsewhere. Dr. Lee said he thought Dr. Bulkley's suggestion of the trap door arrangement in the anterior sheath of the rectus, that is, folding this fascial flap laterally, was also a very valuable one, and while he had found it described in the literature he had never employed it. Sometimes he had thought the sutures were quite taut but so far he had had no particular trouble from this source in his cases, at least so far as he could determine.

The meeting adjourned.

F. A. Olson, M.D.,
Secretary.

IRRADIATED MILK

Enough evidence is available, from the clinical as well as the experimental field, to give assurance that rickets can be averted. To give some idea of the number of antirachitic agents at present offered, mention may be made of cod liver oil and cod liver oil concentrates, viosterol (irradiated ergosterol) irradiated products of the utmost diversity, foods fortified with viosterol, and direct ultraviolet irradiation. Obviously, it ought to be of advantage if antirachitic properties could be imparted, without attending deterioration, in a suitable degree to a few foods that enjoy widespread use, particularly in the dietary of childhood. Probably the two most universally consumed foods are bread and milk. That is why interest has begun to be centered in these products as means of antirachitic prophylaxis. Milk is of particular interest because of its unrivaled content of calcium and phosphorus—the adjuvants of a properly planned antirachitic regimen. It is gratifying to learn through a recent communication of A. F. Hess and his co-worker that fluid milk can now be successfully activated at almost insignificant cost, that it retains its antirachitic potency after drying, and that both the fluid and the dried products have been extensively tested on children with satisfactory outcome. (Jour. A. M. A., November 26, 1932, p. 1864.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

THE GOLD-HEADED CANE. William MacMichael, M.D. Edited with explanatory and illustrative notes and an essay on William MacMichael, M.D., by Herbert Spender Robinson. 223 pages. Illus. Price, $3.50, cloth. 1932: Froben Press, Inc., 12 Mt. Morris Park West, New York.

NON-TROPICAL SPRUE. Th. E. Hess Thaysen, M.D., Senior Physician to St. Elisabeth's Hospital, Copenhagen. 258 pages. Illus. Cloth. Copenhagen, Denmark: J. Jorgensen & Co., 1932.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES. 199 pages. Illus. Price: $1.00, cloth. Washington: Government Printing Office, 1932.

GENERAL MEDICINE. Practical Medicine Series. Edited by George H. Weaver, M.D., et al. 837 pages. Illus. Price, cloth, $3.00. Chicago, Illinois: The Year Book Publishers, Inc., 1932.

SEX TECHNIQUE IN MARRIAGE. Isabel Emslie Hutton, M.D. Foreword by Ira S. Wile, M.D., 160 pages. Illus. Price $2.00, cloth. New York City: Emerson Books, Inc., 1932.

MENTAL DEFICIENCY DUE TO BIRTH INJURIES. E. A. Doll, W. M. Phelps, and R. T Melcher. 290 pages. New York: McMillan Co. 1932.

Detailed histories of a group of cases of infantile cerebral palsy are portrayed. The mental status in each case was elaborately determined by various tests and the progress over a period of years is described. The use of motor re-education meets with favor in these cases, and under trained hands offers some amelioration of the dyskenesia usually present. Surgery was not attempted in this series, but is of value in a very small proportion of such cases. The study emphasizes anew the need for intelligent, conservative obstetric procedures, and for early interpretation of those symptoms in the new-born which indicate cerebral trauma.

THOMAS MYERS, M.D.

HOSPITALS AND CHILD HEALTH. A publication of the White House Conference. 279 pages. Price $2.50. New York: Century Co., 1932.

The excellent study of hospitals in relation to child health consists of three parts, devoted to a survey of children's hospitals, to convalescent homes, and to medical social service. Attention is directed to the relative scarcity of hospital beds devoted exclusively to pediatric service. On the other hand it is of interest to note that the 6,667 hospitals of the U. S., containing 905,246 beds, were only 69 per cent full in 1929. One may well wonder what the percentage will be for 1932. The inadequate experience in pediatrics during the student nurse's training is emphasized as regrettable. Similarly, nutrition workers are developed who lack clinical contacts. The desirability of the establishment of convalescent homes for adults and for children has been inadequately realized. Many cases of malnutrition, asthma, behavior disturbances, etc., respond best when treated in such an institution.

The need for adequately trained medical social service workers is emphasized. The problems with which such persons should be equipped to cope are thoroughly discussed.

THOMAS MYERS, M.D.

FOR RENT—Office in Hirsch Building, Austin, Minnesota. Formerly occupied by Doctor Coleman, eye, ear, throat specialist. Fine opening. GEORGE HIRSH.

FOR RENT—In Lowry Medical Arts Building, Saint Paul, two rooms in conjunction with two other physicians and dentist, at substantial discount. Reception room door opposite elevator. Telephone Cedar 3477 or La Salle 1182.

FOR SALE OR TRADE—This is a fine outfit that someone can have cheap. One complete X-ray equipment consisting of: One pratically new late model Acme 6:60 Transformer with controls, 220-volt, 60-cycle current; one combination horizontal and vertical radiographic and fluoroscopic Victor Table equipped to do stereo work; one Universal X-ray Timer, 110-volt, 60-cycle current; one complete dark room equipment, consisting of tank and modern accessories. Address D-203, care MINNESOTA MEDICINE.

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FUNCTIONAL GASTRO-INTESTINAL DISTURBANCES*

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IN attempting to estimate the value of purely nervous factors in the production of gastro-intestinal symptoms one should first be sure that his examination is careful and complete enough to eliminate organic factors. This of course is subject to error of varying degrees. Secondly one must be able to appreciate what bearing organic conditions outside of the gastro-intestinal tract may have in the production of these symptoms. The occurrence of purely functional disturbances will also vary to a large extent with the class of patients one is dealing with.

In this paper I reviewed 560 ambulant patients in private practice who had gastro-intestinal symptoms of a degree which would indicate careful study of their gastro-intestinal tract. All of these were given careful physical examinations, blood and urine studies. They were given fractional meals and some of those patients not having free HCl with the fractional meal were given histamine. Barium meals were followed through the gastro-intestinal tract and other special types of laboratory or special work was done when deemed necessary.

In this series of patient there were 405 who had free HCl with the fractional test meal and 155 who had no free acid. Approximately one-half of the patients had fractional meals of bread and water and the other half had 200 c.c. of 7 per cent alcohol. The alcohol was a much easier meal to work with and as far as could be determined by careful study the results with the two meals were approximately the same as regards secretion of acid. As far as could be determined on the basis of our studies in approximately 60 per cent of the cases with free HCl, symptoms were on a purely nervous basis. In the 155 cases with no free HCl, we found that only 34 per cent were on a nervous basis (Chart I). The three predominating diagnoses were irritable colon, duodenal stasis, and visceroptosis. Other diagnoses were made such as gastric neuroses, cardiac neuroses, cancerphobia, psychoses, cardiospasm, and so forth. Of sixty-two of the cases in which there was no free HCl after the test meal, thirty had free HCl after histamine and thirty-two did not. In these two groups having gastro-intestinal symptoms approximately the same number in each were considered to be on a purely nervous basis (Chart II).

An additional factor of interest was the study of the predominating symptoms as far as the gastro-intestinal tract was concerned. Weakness and belching were complained of in 10 to 20 per cent of both groups. Charts III and IV show the various symptoms complained of in these purely nervous cases in percentages, number III showing the cases given the fractional meal, number IV showing a group given histamine after anacidity was found by the fractional meal. The four predominating complaints were, therefore, gas, constipation, abdominal pains, and headache.

Approximately 40 per cent of the total were males and 60 per cent females. Among the males there were only three cases of secondary anemia. All three of these showed free HCl after histamine while among the females about 20 per cent showed anemia in each of the groups of cases with and without acid with the fractional meal (see chart). Where histamine was used, 45 per cent of the cases of anemia in

*Read in symposium before the annual meeting of the Minnesota State Medical Association, St. Paul, May 24, 1932.

women showed acid after histamine and 20 per cent showed no acid.

In this series of patients with gastro-intestinal complaints we were struck by the great variety of pathological conditions of a mild character which need some form of treatment and, of course, should be corrected. However, careful inquiry into the past history of these patients revealed that a large number had a long history of gastro-intestinal complaints which antedated the various pathological conditions found, as if in some way these patients were predestined to develop gastro-intestinal symptoms with the advent of any condition which would tend to lower their general vitality.

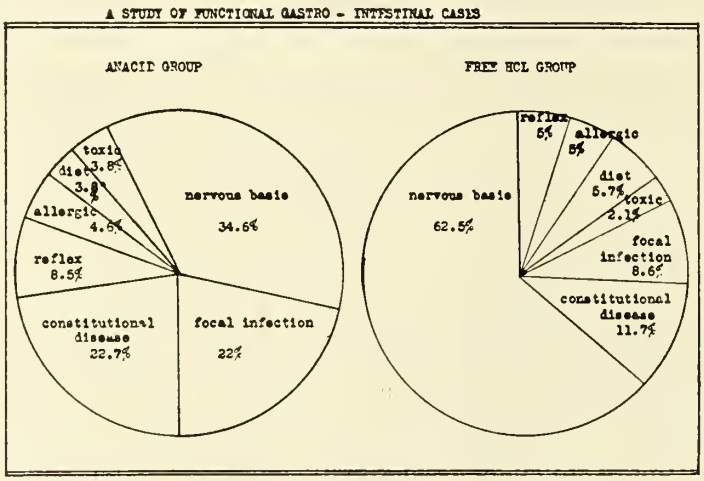


CHART I

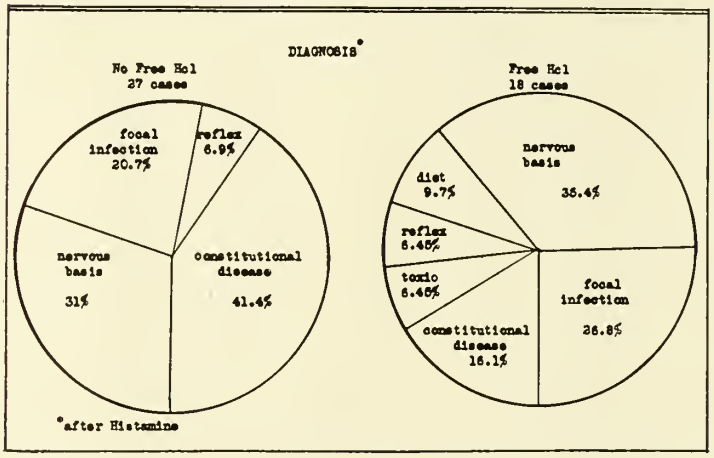


CHART II

TREATMENT

The management of these patients might be well discussed under two heads: (1) treatment of the gastro-intestinal tract; (2) treatment of the individual.

In the treatment of the gastro-intestinal tract the presence or absence of free HCl has very definite bearing on the type of treatment. If the patient has normal or high acid and a tendency to constipation a fairly bland diet which is well balanced, rich in vitamins, poor in bran and roughage, with a prescription consisting of magnesium oxide and calcium carbonate and the addition of either belladonna or atropine sulphate to the point of mild physiological effect, will often give relief. If the constipation is more severe and accompanied by the presence of mucus and attacks of looseness at times, periods of rest are indispensable and also a diet containing a low residue but plenty of nourishment. In addition to this, fairly large doses of calcium carbonate and cal-

cium phosphate are often of value, astringents being necessary in severe cases.

In the cases without acid or with low acid where there is hypermotility of the upper gastro-intestinal tract, the diet should be bland, highly nutritious and well prepared, with plenty of fresh meat. Where the bowels are constipated orange juice and other fruit juices will often regulate the bowels alone, or in addition a small enema of normal saline may be used every second morning.

In the cases of achylia with diarrhea, dilute hydrochloric acid often acts as a specific even in small doses and is much better taken if given in a glass of strained orange juice and sipped with meals. The orange juice may have to be omitted temporarily and astringents used if the diarrhea is severe.

It is important that these patients' teeth should be in good grinding condition and extra energy should be devoted to mastication because in these cases the food passes rapidly into the lower intestines and does not receive the same amount of grinding and mixing in the stomach that it does in a patient with normal acids. In this group of cases small feedings five or six times a day will often make the patient much more comfortable and relieve the empty nauseated feeling of which they frequently complain. A glass of hot milk late at night will often keep them asleep much longer in the morning and prevent the early headache frequently complained of by patients whose stomachs are empty too long.

Much has been written about diet, particularly about bran and roughage as a cause of gastro-intestinal disturbances, and although we know that normal people can eat large amounts of rough food without any appreciable effect except to increase the bulk and frequency of the bowel evacuations, the nervous patient will as a rule develop discomfort under similar conditions, and for the patient with definite pathology such as partial obstruction due to kinks or old strictures, bran and roughage may undoubtedly cause definite intestinal obstruction. I have recently seen

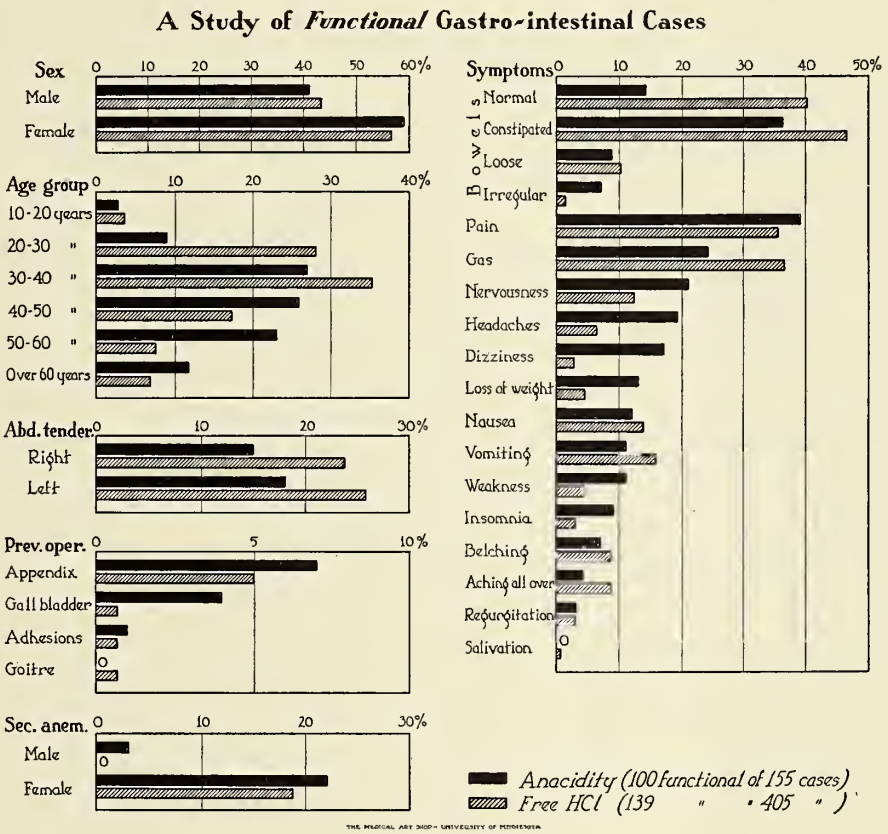


CHART III

one such case with partial obstruction of the ileum due to an annular constriction of a benign character which at operation showed a large ball of bran husks collected above the stricture which had ulcerated through the bowel and produced a general peritonitis. This patient had had mild attacks of cramps and vomiting for ten years at intervals but felt well between attacks. Ten days before the operation she began eating bran for constipation.

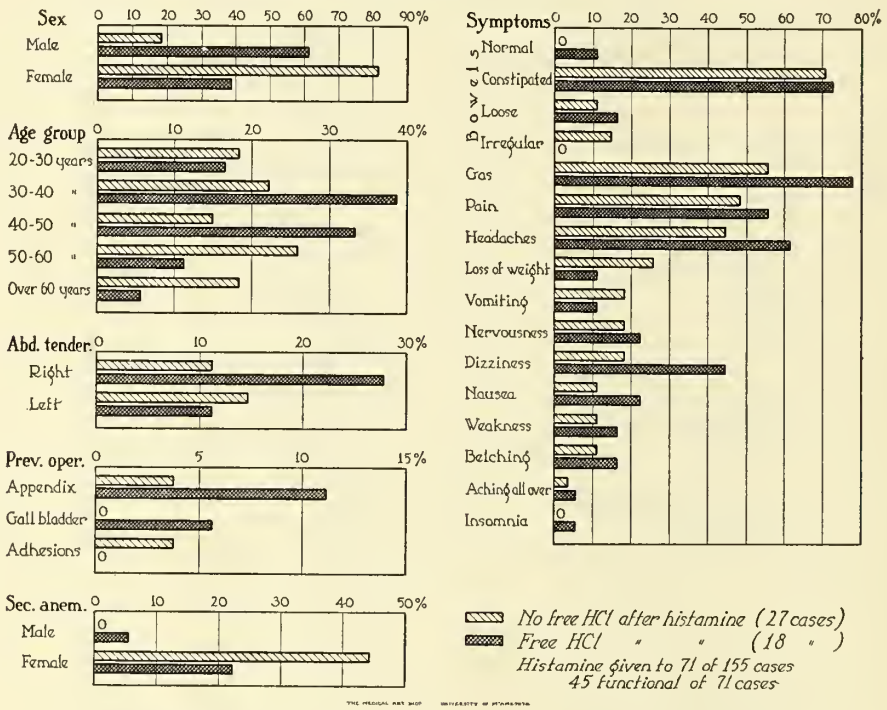


CHART IV

In the beginning of treatment it is as a rule wise to be quite specific as to diet. The patient should, however, be told that the diet should only be followed for a limited length of time and a definitely specified time should be set for a review of the diet. I have frequently seen patients who have been put on diets that were rather low and find them a year later on exactly the same diet, undernourished, and some of them with secondary anemia.

I would like to call attention to two very old therapuetic agents which at present seem to be very little used. One is charcoal. In the patient complaining of gas in the bowel charcoal often has a good effect if given in sufficient quantities, that is a teaspoonful three times a day. It can be given in combination with any other treatment. The second is asafetida. At one time asafetida was given almost routinely to the nervous dyspeptic. In cases where there is a story of much belching I believe this remedy is often of value. The effect is partly psychic and probably partly due to the disinclination on the part of the patient to bring up rather unpleasant smelling air from the stomach. Air is swallowed by everyone. It is only those who have a habit of swallowing large amounts of air and particularly those with tight cardias who do not bring the air up easily who have unpleasant symptoms. Hot water often relaxes the cardia and allows the air to come up easily. Hot water and soda often give relief particularly in a highly acid stomach.

Sedatives such as phenobarbital are invaluable and if given for a limited period of time are as a rule entirely without untoward effects. Large doses are not advisable. They may be prescribed three times a day for the first week, and once at night for the second week, and later at intervals

depending on restlessness and sleeplessness. Cathartics are not indicated in purely functional cases and in a large percentage of nervous individuals are distinctly harmful. One must recognize the fact, however, that normal individuals may take cathartics over long periods of time with apparently no harmful effects. In older people whose peristaltic activity is often retarded, cathartics are absolutely indicated and in people with beginning senile change who are forgetful and often do not remember when their bowels moved, the daily use of a small amount of a cathartic drug such as some preparation of cascara relieves the family and the patient of any responsibility and often cures the attacks of loose bowels complained of by these patients.

The much advertised yeast undoubtedly can be taken with satisfactory results by many people. In many others however it produces discomfort and disturbed peristalsis and unpleasant regurgitation. It is not necessary to prescribe it because most everyone tries it before consulting a doctor.

In regard to mineral oil and various compounds of mineral oil my own experience is against their use routinely on bed patients. Many will develop abdominal discomfort and will gradually expel the oil without a proper bowel movement so that it is better to use enemas, not oftener than every second day, of normal saline or plain water (never soap as a routine) with the occasional use of mild laxatives or purgatives when indicated. Mineral oil in an ambulatory patient works very much better. There is one indication, however, for mineral oil which I feel is definite. That is in the obese patient. Here it has two therapeutic indications: (1) it adds bulk to the contents of the colon; (2) given as salad dressing with meals it tends to decrease the assimilation of food and decreases the amount of nourishment taken.

GENERAL TREATMENT OF THE PATIENT

This, in my opinion, is the most important factor in any real cure. The definite assurance after painstaking investigation that the patient has no organic disease, specifically mentioning diseases which are commonly feared such as cancer, tuberculosis, heart disease and so forth, is very important. Further, one should be careful to discourage minute inspection of the bowel movements by the patient particularly in regard to the size and general appearance of the stools. There is nothing so pathetic as the patient who is constantly worried over this quite unimportant matter which in the patient without organic disease is determined largely by the character and amount of diet. Calling the patient's attention to definitely localized areas of spasm in the colon as the cause of his trouble should also be avoided. A discussion of a spasm with the idea of explaining the symptoms to the patient is entirely rational. To explain it, however, as the cause of his disease tends to localize his mind on one particular area in his abdomen and tends to confuse the real issue. Painstaking and repeated efforts to unearth hidden trouble or fears is necessary before the patient will divulge what he is worrying about. An intelligent and sympathetic doctor, by patiently listening to the story, can often arrive at the underlying cause, which is usually worry and maladjustment. Interviews with other members of the family may also do good in helping adjust the environment to the patient. Lastly, one may help build up in the patient a morale which helps to fortify him in a situation that cannot be changed. Wide experience with human nature and affairs, and all of the art of medicine is required in the proper handling of these patients. They must be seen at regular intervals and reassured. In this way breakdowns can often be prevented. They must be advised as to their diet as these patients absorb all the irrational ideas of faddism and quackery and often by elimination get themselves on a diet which is insufficient and tends to produce malnutrition and often secondary anemia, particularly in women. In women the disturbances of menstruation must be carefully weighed. Long drawn out or irregular or painful menses tends to undermine the morale of the most normal woman. None of these things should be overlooked. Mild secondary anemia should not be neglected, a condition so common during the late menstrual life of women, impairing their efficiency and making them a prey to chronic infections and lowered nervous vitality.

In the undernourished individual increase of weight by rest and frequent feeding and supernourishing diet often completely changes the clinical picture.

The obese patient who eats, not wisely but too

well, demands entirely different treatment. A well balanced, low caloric diet with plenty of vitamins and gradually increasing exercise may bring about a remarkable improvement.

One should have no stereotyped exercise such as making a man play golf who cannot afford the time and has not the inclination. Systematic exercise is the important thing and should be fitted to the needs of the individual. Many middle aged individuals do themselves harm by suddenly taking on exercise to which they are not accustomed for the purpose of curing constipation, overweight, or a feeling of general lack of well-being.

CARDIAC NEUROSIS*

Harold E. Richardson, M.D.
Saint Paul

FEAR is one of our dominant emotions, and man is primarily an emotional creature. In danger, man reacts immediately, according to his emotions rather than to his intelligence and training. Cardiac neurosis is this basic fear applied to heart disease. In this condition, the subjective cardiac symptoms and the patient's mental attitude towards them are usually out of proportion to physical findings and any information gained from graphic records.

The potential framework for a neurosis of one kind or another is present in all of us, but needs the right set of circumstances and events for its full development. This is especially true and more easily brought about in those who have two strikes already called on them when they are born with unstable nervous systems, a heritage from parents similarly handicapped.

Fear of sudden death may originate in childhood. All through life, attention is focused on the heart, in conversation, in literature, in the theater, first as a seat of the finer emotions, and later as the most vital of our organs, which, in disease, takes more lives each year than do cancer and tuberculosis together.

This is contributed to by the newspapers, with all their accounts of sudden death from heart disease, and may be strikingly emphasized by personal experiences in one's own circle. Even our own propaganda, designed to help people, which advises periodic examinations in the hope of prolonging useful life and reducing mortality from heart disease, further implants upon them the all-importance of this organ. While aware of this, one thinks of it in a detached manner, more in terms of the other fellow, until some situation arises which crystallizes one's thoughts on his own heart and makes him realize that this thing he has gradually learned to fear all his life has suddenly become applied to himself, whereupon he is consumed by a poignant, paralyzing fear that sends him to a physician.

Many people without heart disease consult us in relation to their hearts but all are not cases of cardiac neurosis. Many of them are merely cardiac anxious or curious, and, after an examination and some well chosen remarks, have no further trouble. One prominent cardiologist here in the Northwest told me that he spends over half his time convincing people that they do not have heart disease.

Etiology.—Cardiac neurosis is due principally to the fear of sudden death. A secondary fear is of partial or complete incapacitation.

The precipitating event which focuses one's attention on his heart may in itself be trivial—a consciousness of his heart beat after a full meal, after alcoholic drinks, the normal dyspnea after unusual effort, or a palpitation and tachycardia, normal to the circumstance. We understand these events, but the patient does not. On the other hand, it may come from the outside, and be due to a careless word, action, or suggestion on the part of a physician, who may be examining him in some routine manner. It is worth while to remember that our expressions, actions, and attitudes must be non-committal, and should never be allowed to betray us. Suffice it to say that something happens which focuses the individual's attention upon his own heart and sufficiently frightens him. Whether this individual becomes a case of cardiac neurosis or not de-

*From the Division of Medicine, The St. Paul Clinic. Presented in symposium before the annual meeting of the Minnesota State Medical Association, St. Paul, May 24, 1932.

pends upon his mental stability and the way he is handled, and herein lies the responsibility of the medical profession.

The group of patients classified under neurasthenia, neuro-circulatory asthenia, effort syndrome, and the like makes up a large percentage of the cardiac neuroses. Here we commonly find breathlessness, tachycardia, variable heart pains and easy fatigability as the result of the general make-up, but when these symptoms are thought to be due to a diseased heart, cardiac neurosis is likely to follow.

These people do not have the cardiac reserve strength of the normal individual. They are really of the "race horse" type and are not physically endowed for the "heavy truck horse" work. Most of them could be reasonably well if they would and could stay within their physical limits, which, by nature of their endowment, are necessarily very narrow, but they get into difficulty by constantly overdoing as well as being in an almost perpetual state of chronic nervous exhaustion.

Another type we must recognize, though less common, is the individual who is the result of a great physical discrepancy between two parents, where the offspring is endowed with the large bulky frame of the larger individual, and the small cardio-vascular system of the smaller parent. This type has been spoken of as the "Ford Engine in the Lincoln Frame." These people, in spite of their large bulk, have a small amount of reserve cardiac strength and are no better able to stand up under heavy work than is a member of the more readily recognized neuro-circulatory asthenia group mentioned above.

The convalescent state from illness or major surgical operation may also contribute to cardiac neurosis. At any state in our life, we are the result of our natural endowments whether they be good or bad, plus the result of our past diseases. Prior to a given illness, the cardiovascular system might be wholly adequate, but after that illness it might never be the same. Any attempt to shorten or hurry up convalescence is inviting trouble. This is the one time when nature should be allowed to take her own course, and when we should make haste slowly. The best way to do this is to avoid excessive fatigue.

Types.—Cardiac neurosis has no necessary relation to the degree of heart disease present. We usually think of cardiac neurosis as applying only to the type of case in which there is an abnormal cardiac anxiety present without any physical findings to explain it. This is only one of three major types.

The first is the type just mentioned, where there are no cardiac findings of importance to explain the subjective symptoms. If the neurosis persists after careful examination and correct handling at the time of the examination, this patient has a true anxiety neurosis. If this same procedure clears up his problem, then he has merely cardiac curiosity. In discussing this question with my confrères in the field of neuropsychiatry, I was surprised to find that they see few cases of cardiac neurosis except those of true anxiety neurosis.

Second, we have cardiac anxiety, or cardiac neurosis, if you will, plus the possibility of heart disease. We find simple murmurs and doubtful or slight enlargement but an absence of any type of decompensation or findings of a serious nature. Most of these have been previously told they have heart disease. The problem with these is to convince them that their symptoms are out of proportion to their findings and their fear has no foundation.

In the third group, we have definite signs of heart disease, such as a clear enlargement, an important disorder of the heart beat, signs of heart failure, either of a congestive or anginal type, with a superimposed cardaic neurosis. Usually people with definite or advanced heart disease are not neurotic, but when they are, their management requires rare judgment, tact, and common sense. Frequently it is easier to treat the organic heart disease and its resulting symptoms than it is the neurosis, and in some instances the organic disease must be ignored for the treatment of the neurosis alone. Oftentimes frankness is the easiest way out of the problem.

Cardiac neurosis may be considered from the standpoint of both the patient and the physician. The patient has an all-compelling fear that he may drop dead because of a real or fancied heart disease, or that it may make him an invalid. He believes this is a possibility because of a train of symptoms he experiences and believes his heart to be the cause. He consults a physician, in the hope that his symptoms are trivial but with the conviction that they are most serious. If he is properly handled by the first physician, and if he has the proper nervous and mental make-up,

his overpowering dread may be dispelled and he may again resume his normal place in society; but, let him sense a lack of understanding, a lack of sympathy, or a fancied inadequacy or deception on the part of the physician, and he leaves his office unconvinced, and seeks another opinion. In this way, he goes from one to another with his fear swiftly becoming more deeply rooted, and his outcome more problematical. It is no wonder, after many failures to get relief, if he turns to Christian Science or the cults as a last resort.

All these cases require a very thorough and complete examination. The physician should be fully aware of the responsibility that he is undertaking, and he must be prepared to be sure of his ground. These are some conditions that must be definitely found or ruled out: (1) organic disease in the heart and elsewhere in the body; (2) hyperthyroidism; (3) early tuberculosis; (4) early cardiac decompensation.

A complete history is imperative, and, in getting this, every effort should be made to gain the confidence of the patient, and get him to talk. Let him tell his own story, and don't hurry him. Remember he always feels he is not understood.

One must attempt to elicit a history of premature contractions, attacks of paroxysmal tachycardia, precordial or substernal pain, or a history of pain on effort, in attempting to find the basis of his cardiac anxiety.

Focal infection in tonsils, teeth, sinuses, gall bladder, and appendix, the cervix uteri in the female, and the prostate in the male, all must be sought for, properly appraised, and eradicated when thought to be playing any part as the underlying cause of cardiac symptoms. Substernal pain, especially on effort, or associated with vomiting, suggests true coronary disease, in contrast to precordial pain, which, especially in young people, is likely to be of no cardiac importance. Angina pectoris presents its characteristic train of symptoms and this diagnosis should not be presumptive or without adequate grounds.

The complete physical examination is essential, and if one has access to the X-ray or the electrocardiograph, these adjuncts are most helpful in convincing this type of patient that he has been most carefully examined by every means possible. A careless history, a superficial examination, and a "good fellow slap on the back" are worse than none when one is dealing with these individuals. This only too quickly sends them to another physician.

From the standpoint of the physician, however, the picture is entirely different. He sees an individual coming to him with an exaggerated statement of symptoms. He may be prejudiced in his own mind against the patient, merely by the recitation of the facts of the history, and, besides, he may be very busy and feels he cannot give the time this type of case requires, so he takes the short cuts all of us are guilty of at times. His examination, whether it is complete or perfunctory, convinces him that there is no cause for alarm in relation to the heart, and, without sensing the seriousness of the situation, he makes light of it, and dismisses the patient in a summary fashion, expecting him to fall in line, but he goes away unconvinced.

Quite the opposite may happen but is none the less serious a mistake. Here the physician is so impressed with the statement of the patient that, on failure to find adequate physical signs to explain the symptoms, he doubts his own ability, and, in a very half-hearted fashion, tells the patient that he can find nothing wrong with the heart "but" he should be careful. All the good that might have been gained is lost with this last statement, which carries with it the element of doubt and uncertainty.

Another mistake is to give the patient a cardiac medication after he has been carefully told that there is nothing wrong with his heart. A great mistake is to accept a previous cardiac diagnosis and fall in line, without impartially convincing one's self of its correctness.

I wish to recommend caution in making a diagnosis of cardiac neurosis. This must not be used to cover up our mistakes. It should be made by exclusion only after everything else has been carefully ruled out, for once this diagnosis is made, it may be difficult to see one in any other light. Only too often a patient with real pathology is made to endure needless suffering, incapacitation and humiliation, as a result of an unwarranted diagnosis of cardiac neurosis, until someone with courage and curiosity finds the real trouble. It is a part of our obligation to the public to be sure of our ground, and when a patient consults us for an opinion on his heart, we should be equipped with the necessary knowledge to render a fair and reasonably correct decision convincingly, either one way or the other.

By far the greatest number of cases of cardiac neurosis must be seen by the man in general practice for he is the one who would naturally be consulted first and with him, in the same way, must rest the responsibility of the proper handling of these cases. However, there are some patients, a few in number, whom it is wiser to turn over to those men more expertly trained in neuro-psychiatry. Into this group will fall only those cases of true anxiety neurosis with cardiac fixation, only those people in which the fear of heart disease is entirely unwarranted, and is based on some deeper psychological mechanism which requires special technic.

CONCLUSION

1. Cardiac neurosis is the persistent fear of premature death or invalidism through the medium of heart disease.

2. The latent potentialities for this or other neuroses are present in all of us, but need the right set of circumstances and events for development.

3. Persons with unstable nervous systems and poor endowments from parents are rendered more susceptible.

4. Any circumstance which sufficiently excites fear in relation to the heart may be the starting point of a cardiac neurosis.

5. This basic fear may be aggravated by improper handling by physicians.

6. A diagnosis of cardiac neurosis should be made only after the complete history, physical examination, and graphic records (if available) have ruled out all other possibilities, and then only reluctantly.

7. Cardiac neurosis can and should be adequately handled by the man in general practice, as well as by the internist or cardiologist, whichever is consulted first, except in those patients with a true anxiety neurosis with cardiac fixation who may eventually have to be referred to the neurologist.

8. Cardiac neurosis, in one degree or another, is so wide-spread as to demand our careful attention and sympathetic consideration rather than a belittling attitude, or one of contempt, that it so often calls forth.

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TREATMENT OF AFFECTIVE DISORDERS*

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THE word affect refers to feelings (of the mind), moods, emotions, sentiments or temperament. Instinct is represented in the mind as affect. Affect-laden ideas are associated with many "nervous" symptoms.

Affect or feeling is the awareness of changes in the body from the impact of environment, or the product of changes in biological equilibrium (from within). There are two primary types of feelings: pleasure and pain. It is a psychologic axiom that the organism tends toward the maintenance of pleasure or comfort and aims

*Presented in symposium before the Minnesota State Medical Association, in St. Paul, May 24, 1932.

to avoid pain or discomfort. Whereas comfort is associated with a persisting receptive or passive state, discomfort or pain implies increased muscle tonus, a flattening of the respiratory curve, a reflex vaso-constriction with rise of blood pressure; and a diminution of skin resistance to the psychogalvanic reflex, particularly to situational stresses—active changes.

Pathological feeling states are exaggerations or mixtures of normal affects, or absence of same, namely, apathy. The commoner normal states of feeling are fear, elation, sadness and their variants: anxiety, gladness, happiness, sorrow, etc. Abnormality of affects is measured by the depth, duration and setting. Irritability is connected with a feeling of insufficiency; anxiety signifies, usually, a fear of danger from within, and may arise after continued state of fear. It may develop episodically.

Behavior or conduct is largely determined by affect. Physiological changes are inadequate in the explanation of conduct or response to an emotional excitant; the response is rather the reaction of the entire individual to a situation. Consciousness guides, rather than originates, individual activities.

These fundamental formulations are basic to a consideration of treatment.

A therapeutic approach must necessarily follow along the lines of causation. We recognize two main causal categories: somatogenesis and psychogenesis.

There has, in the past, been much discussion on the relative importance of organic versus psychologic factors in causation, as well as in therapy. Some would have gone so far as to almost disregard the one or the other.

Today it may be asserted that, for theoretical as well as for practical considerations, body and mind are indivisible. We know that the mind is dependent on the entire physical make-up. Behavior, first of all, even in the simple protozoön indicates, strikingly, a purpose, an aim,—evidence of primitive mind. Tissue cells of component parts of our bodies, having nothing to do with consciousness, act and react to a remarkable degree of integration in accord with a definite plan. Functions of the nervous system are the specialized, most highly integrative of all the bodily systems.

It follows, then, that mental symptoms including feeling disturbances may arise not only from disease of the nervous system, but also from diseases of other bodily systems, hence the therapist's attention to biogenetic, to other organic factors from within.

The other important avenue of therapeutic direction is toward the psychological level. Environmental impacts in turn initiate affective disorders accompanied by greater or lesser associated physical changes. Causation, in this connection, is referred to as psychogenesis. Psychogenetic and organic factors require consideration, sometimes more the one and less the other, and vice versa, in the majority of our psychiatric disorders; thus, the necessary emphasis that each nervous patient is an individual medical problem.

Anxiety and other symptoms of affect disturbances are observed in some of the well known psychoneurotic as well as in major psychotic syndromes:

1. General irritability, a common sign, implies an accumulation of excitation to a degree of intolerance.

2. Anxious expectation, observed in hypochondria, in anxiety neurosis, melancholia, etc., signifies apprehensiveness, loosely controlled, prone to attachment to ideational content of the moment.

3. Anxiety attacks are sudden eruptions into consciousness.

4. Anxiety equivalents, of particular importance to the internist for example, are manifested by spurious responses on the bodily organs: the heart, lungs, gastro-intestinal system, glands of the skin, skeletal muscles, blood vessels and internal secretory glands.

The "disordered action of the heart" of the war period later proved to have anxiety as a prominent factor in its causation. Palpitation and tachycardia occur frequently. The commoner gastro-intestinal symptoms are nausea, biliousness, ravenous hunger and diarrhea. Nervous dyspnea and asthma-like attacks are recognized and perspiration from emotional excitation is certainly not rare. Giddiness or vertigo, and nightmare (pavor nocturnus) may represent only an anxiety attack. Though the latter two may be accompanied by manifest feeling disorder, the therapist must realize that most of these symptoms just mentioned may mislead one by their seemingly physical aspects. Investiga-

tion of the psychological setting must be undertaken to yield the necessary clues.

Psychotherapy is not limited to technics wholly psychological. Rather it applies to all those methods that may be employed in the management of psychic disorder. Individual case investigation will determine what methods are to be utilized.

The psychotherapist attempts, first of all, to determine the patient's hereditary endowments and constitutional make-up. He must gain a reasonable impression of the family setting, of the emotional and intellectual development and of the social and economic situations. He bears in mind that, while psychogenic factors may have to bear the burden of causation and thus also the principal consideration in treatment of some patients, it is nevertheless incumbent upon him to investigate the bodily systems, including, above all, the endocrines, special senses, the nervous system. Chronic infections and intoxications cover a large but most important field of study in all cases.

The psychological investigation attempts to determine, first of all, whether there are situations present which still operate to produce conflicts, or if the emotionality is due to experiences of an earlier period. Having gained experience and insight in this endeavor, he will often note early some clues that point that way.. He then decides on the particular method of psychotherapy.

With the organic factors attended to, the psychic methods are considered.

Hypnotism, much in vogue at one time, is now quite obsolete and need not be considered because of vicious after-effects.

Persuasion, a simple method, is quite inadequate in most instances; it does not reach the actual trouble. While temporary alleviation of the affective disturbance sometimes takes place, as many physicians have opportunities to observe, the patient is not permanently benefited if neurotic fixation is present.

Suggestion implies a more complicated, more radical method than persuasion, but it also is inadequate, in that the underlying factors are untouched. Sometimes the older and less intelligent patients can be relieved by this method when some dimming of consciousness can be obtained.

Psychological re-education, or therapeutic conversation, leads to much good in many patients, after they have been allowed to talk freely. The patients can themselves sometimes grasp how they have erred and can change their viewpoints and attitudes to a successful degree. This applies especially to the childhood years and to certain "high grade" or acute psychoneurotics.

Mental analysis, or psychoanalysis, has a disadvantage in that the required amount of time often makes it impractical. It is the Freudian method, still in a controversial status, though gradually becoming more common. This method has undergone some modification in this country, especially following war-time experiences. Freud's doctrines include, however, a theory of psychology as well as a particular type of psychotherapy. The principles of the Freudian psychology influence all psychotherapeutic technics. Less of theoretical expansion and more outlining of the fundamental principles in understandable psychobiological terms is desirable to obtain the most practical psychotherapeutic gains. As a matter of fact, Freud himself would limit his therapeutic method to the chronic neurotic, so-called. Here the presence of memories associated with repression and conflict are accessible only through analysis. These memories are the foundation of symptoms as well as neurotic reactions and character traits; and they are associated with active impulses conditioning behavior. Anxiety, with fears, is thus motivated. In these patients, let it be remembered, it requires a long period of time to complete successfully a psychoanalytic form of therapy.

A modified form of analysis requiring twelve to thirty interviews, with free association, and aiming at some necessary explanation and re-education, proves successful in the majority of the psychoneurotic affective states.

THE ELEMENT OF FEAR IN THE DEVELOPMENT OF FUNCTIONAL DISORDERS*

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THE word fear appears in the Bible some 500 times. The fear of damnation and everlasting punishment was used by revivalists in the past, I believe, more than at present, but this method has been used with telling effect upon the emotions, it being recorded that sometimes whole congregations would be thrown into a grotesque display of hysterical manifestations.

The question has been raised as to which of the two men, Billy Sunday and Henry Ford, has done the most for humanity. Henry Ford, of course, because he has shaken the devil out of more people than Billy Sunday will ever reach.

Because I feel that a sympathetic chord will be struck in many hearts here today, including my own, permit me to quote that classical account of stage fear from the pen of the great psychologist Mosso, which depicts his own feelings when he was to appear before an audience:

"All I had to do was to communicate the results of my investigation into the physiology of sleep, and yet, as the hour drew nearer, stronger waxed within me the fear that I should become confused, lose myself, and finally stand gaping, speechless, before my audience. My heart beat violently, its very strings seemed to tighten, and my breath came and went, as when one looks down into a yawning abyss. At last it struck eight. As I cast a last glance at my notes, I became aware, to my horror, that the chain of ideas was broken and the links lost beyond control. Experiments performed a hundred times, long periods which I had thought myself able to repeat word for word—all seemed forgotten, swept away, as though it had never been.

"My anguish reached a climax. So great was my perturbation that the recollection of it is dim and shadowy. I remember seeing the usher touch the handle of the door, and that, as he opened it, I seemed to feel a puff of wind in my face; there was a singing in my ears, and then I found myself near a table in the midst of an oppressive silence, as though, after a plunge in a stormy sea, I had raised my head above water and seized hold of a rock in the center of the vast amphitheatre.

"How strange was the sound of my first words! My voice seemed to lose itself in a great wilderness; words, scarce fallen from my lips, to tremble and die away. After a few sentences jerked out almost mechanically, I perceived that I had already finished the introduction to my speech, and discovered with dismay that memory had played me false just at that point where I had thought myself most sure; but there was now no turning back, and so, in great confusion, I proceeded. The hall seemed enveloped in mist. Slowly the cloud began to lift, and here and there in the crowd I could distinguish benevolent, friendly faces, and on these I fixed my gaze, as a man struggling with the waves clings to a floating spar. I could discern, too, the attentive countenances of eager listeners, holding a hand to their ear as though unwilling to lose a single word, and nodding occasionally in token of affirmation. And lastly, I saw myself in this semicircle, alone, humbled, discouraged, dejected—like a sinner at confession. The first greatest emotional disturbance was over; but my throat was parched, my cheeks burned, my breath came in gasps, my voice was strained and trembling. The harmony of the period was often interrupted in the middle by a rapid inspiration, or painfully drawn out, as the chest was compressed to lend force to the last words of a sentence. But to my joy, in spite of all, the ideas began to unfold of their own accord, following each other in regular order along the magic thread to which I blindly clung without a backward glance, and which was to lead me out of the labyrinth. Even the trembling of the hands which had made me shake the instruments and drawings I had from time to time to exhibit, ceased to last. A heaviness crept over my whole body, the muscles seemed to stiffen, and my knees shook.

"Towards the end I felt the blood begin to circulate again. A few minutes passed of which I remember nothing save a great anxiety. My trembling voice had assumed the conclusive tone adopted at the close of a speech. I was perspiring, exhausted, my strength was failing; I glanced at the tier of seats, and it seemed to me that they were slowly opening in front of me, like the jaws of a monster ready to devour me as soon as the last word should re-echo within its throat."

Anxiety, worry, panic, and so on, are but synonyms of fear. The major portion of our present economic condition can well be ascribed to this state of mind. The mind may have its wounds as well as the body, in many instances leaving indelible scars which interfere with normal functioning, not only of the mind itself, but of the physiological processes of the body.

We have many common expressions denoting the effects of fear, such as: "My hair stood on end; rooted to the spot; paralyzed with fear;

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heart stopped beating; came up in my throat, or dropped into my boots, etc." Then we have some vulgar expressions for the effects produced upon the intestinal and urinary systems. The cartoonist had Mutt and Jeff at the front during the late war. They were hard pressed by the enemy and beat a hasty retreat, followed by some shots from the rear. Mutt yelled, felt of his nether region and said: "Jeff, I'm shot, I'm shot." After a cursory examination Jeff remarked, "No, Mutt, you're not hit. Blood is red."

I was called to see a little girl who had a sore throat. She was obstreperous and was not going to permit an examination. Placing her on one of my knees and pinning her extremities between mine while her mother handled her arms, the examination was completed. However, she was all wet and so was I. My method since then has been modified.

Common indeed is the impotence caused by fear of lost manhood, most frequently brought about by the reading of quack literature. All of us here have many times witnessed the syncope produced by the fear of being vaccinated or having a simple dressing applied to a minor wound. There are authentic cases cited of whitening of the hair within short periods of time. A laborer of York, falling from a high building, managed to catch and hold onto a rain spout. When rescued, his hair had become white. It is assumed that the nerves of the hair follicles may somehow be connected with the cells of the medulla or cortex, or that the hair itself is as good a conductor of nerve currents as it is of an electric current. The complete suppression of lacteal secretion has been noted in several instances. In both anger and fear, the X-ray has proven indisputably the cessation of the function of digestion. The glandular system is more or less profoundly affected, depending upon the degree of emotion experienced, as witness the behavior of the sweat and salivary glands. From the adrenals is poured forth a strong dose of adrenalin, exerting its influence on the various functions of the body. Fear experiences have claimed many victims of hearts not functioning properly and has even claimed the lives of apparently normal individuals. In Copenhagen some medical men performed an experiment on a man condemned to death. Blindfolding him, they pretended to bleed him to death. He died promptly. Personally, I had the unfortunate experience of losing a neurotic patient after a comparatively safe and simple operation. A painstaking examination previously had revealed no physical abnormalities except that operated upon, but after that event, fear that she would not get well was writ in flaming letters upon her countenance and in every act. It seemed impossible, within reasonable therapeutic limits, to obtund this fear. The heart action became more and more rapid and she died, evidently, from an exhaustion produced by fear.

A few years ago I became heir to a syphilophobic—the most pronounced case of fear of disease I have seen. He could not be classed as a neurasthenic. Phobics, unlike neurasthenics, do not differ from the normal individual with the single exception of their phobias. This individual consulted a local physician for some obscure symptoms. He was referred to a fair sized clinic, where he was examined and a blood sample procured. Some days later the local physician received word that the patient was Wassermann positive. The man was told that he had syphilis and treatment with arsphenamine intravenously was instituted. Later he journeyed to the largest clinic in the state, where he unquestionably was thoroughly examined and was told that he was not so afflicted. While there he observed other bona fide cases in various stages of the disease, adding to his fears. Returning, he was told that, since he had been treated, the tests could be negative and he might still harbor the malady. He drifted to me, then, with a positive diagnosis, and a fear complex which would not be denied. Any ache, soreness or pain anywhere was immediately attributed to this disease. At various times when I have been out of town he has consulted other physicians and has by them been assured that his symptoms did not indicate any trouble of that nature. He made two more excursions to the large clinic, each time being assured that he was a well man. During a time when we were having a clinical course in our society I prevailed upon one of our eminent neurologists, who was to appear on our program, to drop into my office and examine this patient. I had given him a history of the case and had told my phobic that I was quite sure that a cure had been reached and wanted this specialist to bear me out in this assertion. All this to no avail. He admits that these medical men who are so sure about his case may be good men, but

he is more firmly convinced that he is still afflicted. Frequently he has gone part way on his journey home only to turn back as he felt a twinge here or discovered a blotch there. In the busiest season he has left his plow in the furrow, so to speak, to be bolstered up again and again by the assurance that some sign or symptom would not eat away at him or make a cripple of him.

He has gotten the smell and taste of the intravenous arsenicals. This agent, he knows, can at least inhibit and may some time cure him of his affliction. He craves it almost as much as the morphine addict does his hypodermic. For the time being it lessens his fear and a few very small doses will allay his symptoms and restore his confidence sufficiently to carry on, sometimes for several weeks, with frequent visits for reassurance that all is well. The time is sure to come again, however, when his fears and fear-produced symptoms and signs demand something else than words of assurance.

Reading an article recently on mental hygiene, I came across this, which I quote in part: "If the patient is clinging to his symptom * * * and the physician takes his symptom away from him, the physician may be paving the way for a complete nervous break-down, or even insanity." I have serious doubts, in this case, of the wisdom of turning this patient out. I believe that he will need to be nursed along with the hope that some favorable circumstance may some time bring about an obliteration of his fear. Otherwise I should fear for the integrity of a mind sound in other respects.

We have our heart, cancer and hypertension phobics. Time does not permit me to dwell in further detail upon the subject. I believe that it can truthfully be said that no other profession, nor trade nor organized body of men is so prone to self-criticism as is the medical. We need constantly to bear in mind this element of fear, and exercise the utmost care, keen discretion and tact, not only in our diagnoses, but in our pronouncements to our patients. Faith cults and quacks wax rich on this state of mind. It is well to possess fear, but not to be possessed by it.

THE APPEAL OF QUACKERY TO THE NERVOUS INVALID*

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NERVOUS persons, chronic invalids, and so-called incurables supply most of the income of the 7,650 osteopaths, 16,000 chiropractors, 2,500 naturopaths and allied practitioners, and 10,000 Christian Science and New Thought healers now in the United States. According to L. S. Reed, who recently analyzed the situation for the Committee on the Costs of Medical Care, these 36,000 persons collect each year about $125,000,000.

Some of my readers doubtless wonder at times why these people continue to thrive, especially in the face of repressive legislation. Why in most states do they succeed in tearing a hole through every legal fence that is built between them and their prey, and why in every state that I know of are the so-called religious cults of healing absolutely untouchable by the legislature? So far as I can see there can be only one answer to these questions and this is that these people cater to some need or belief long since implanted in the human heart. Apparently, since the beginning of time, there have always been two types of healers in the community: one the student, the user of herbs, the setter of bones, the practitioner of surgery, the inheritor and user of every bit of real medical knowledge gathered through the centuries, and the other the ignorant witch doctor or priestly healer who treats disease by incantations, hocus-pocus, and the casting out of demons. From the one group we have as a lineal descendant the modern physician who employs every useful drug, every therapeutic device, and every operation ever discovered, from prehistoric times up to the present; from the other group have come in unbroken line all those who heal by faith or by systems based on faith.

Old superstitions are slow to die. One thinks

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of astrology and alchemy as delusions of the Middle Ages but today Evangeline Adams gets fifty dollars for a horoscope, and the president of Germany recently lost heavily in a company organized to make gold out of base metal.

One of the leading advertising firms in America has just published a book based on years of research into the results obtained from the expenditure of many millions of dollars in their business. The author's main theme is that any copy not written in language understandable by a child of thirteen years will go over the heads of so large a fraction of the people in these United States that it doesn't pay to write it: certainly it will not bring results. It would seem obvious then that quackery must continue to thrive, perhaps for centuries, and especially in those communities in which a large part of the population is made up of well-to-do but particularly ignorant and credulous people.

Some of these persons will go to the quack, attracted by his advertising and by the idea that here is the latest thing in medicine. An insurance company once asked a man in a small town to send them a medical certificate of illness. He wrote back apologetically to say that since there was no chiropractor in town he had had to go to a regular physician and he hoped that this behavior would be overlooked or condoned! Other persons go to the Chinese herb doctor or the Kickapoo Indian because they think the ancients or the uncivilized had some secrets of healing not yet known to the moderns.

Others again for a time will flock by thousands to some long-haired man who will say a few words, or touch them on face or hand or foot. They have the idea that God has in some way ordained him as a natural healer.

Many others go to the quack or to the healer because they are against regular medicine and all its works. Some inherited strong antagonisms from their parents; others acquired them through reading the journals of Bernarr McFadden and his ilk, while others acquired them after some unfortunate experience with a regular practitioner. To these groups belong the antivivisectionists and the antivaccinationists. In any legislative fight they love to combine with the faith healers, the cultists, and the vendors of patent medicine to strike a blow at the "great medical trust."

Other fairly intelligent persons of radical tendencies fail to see that the examination and licensure of physicians, if properly done, would protect the public from injury by scoundrels and ignoramuses. To these mistaken people the quack who cannot pass an examination promptly becomes an underdog or a person who is being persecuted by the "medical trust," and accordingly they rush to his relief with special laws and exemptions. Strange to say, university towns commonly are hot-beds of quackery. Too often the professor thinks that because he knows a lot about mathematics or history or Greek, he automatically knows a lot about medicine and diet and vaccines and serums.

Then there is the large group of chronic invalids, some intelligent and many ignorant, but all discouraged and desperate enough to try anything. These go to the quack because regular physicians, oftentimes the best in the land, have failed to make a clearcut diagnosis, have failed to give or even to promise any relief, have failed to do anything in the line of treatment, and have, perhaps, failed even to show interest, understanding, and sympathy.

Many of the sick insist on a positive diagnosis; they want an unequivocal promise of cure; they want something that at least looks like attention and treatment at frequent intervals; they want small charges within reach of their purse, and some of them want a doctor who can be counted on not to suggest an operation.

Many fairly intelligent persons enter the office of the irregular practitioner without faith, but desperate enough to try anything once. Others, unacquainted with the fact that there are such men as trained orthopedists in the medical profession, go to an osteopath for the treatment of myositis or arthritis and get better attention and relief than they can get from the average physician who thinks only of giving sodium salicylate or aspirin, or of removing teeth or tonsils. Naturally they are grateful, and all would be well if later they did not go to the beloved osteopath with the early symptoms of carcinoma of the stomach or pernicious anemia, diseases about which he knows nothing.

The nervous woman often takes up Christian Science at the behest of friends or because she seeks escape from fears and phobias, from a bad prognosis, or from the need for an operation. If she succeeds in accepting the teachings of Mrs. Eddy and if negation really triumphs over fear,

she finds peace and freedom; she does what physicians have for years begged her to do, and she doubtless tends to gain happiness and health.

A woman will often for a time swear by the quack because, in the first place, he has convinced her that at last the cause of the trouble is found: the cause that all of the physicians overlooked. Moreover she has now the promise of a cure and this serves to buoy her up. She is happy because the new practitioner is interested in her case. He sees her every day or every other day; he has time to talk to her; he uses words that are within her comprehension, and he expounds ideas about disease which sound reasonable because they fit well with her inherited body of beliefs.

Still better, he *does something* for her at each visit. He kneads and rubs and manipulates; he applies electricity or ultraviolet light, or he washes out her colon and waxes enthusiastic with her over the amount of mucus removed.

Because he collected his fee in advance she is able to go to him whenever she desires without worry about money. If at first she is disappointed at her failure to see much improvement, she is reminded that the complete cure was promised only by the end of six months.

Perhaps she has been impressed by the quack's advertisements or by the splendor of his office, his electrical equipment and his other stage properties. Furthermore, if she has gone ahead against the advice of relatives and friends, she is never going to admit, if she can help it, that she was "stung." Patients will commonly complain bitterly about the behavior of some of their physicians but they rarely will say anything prejudicial to the quacks whom they have employed. Almost always these men are spoken of as friends who did the best they could according to their lights, and if they didn't cure the cancer of the lip and if they did let it get down into the neck, at least "they were wonderfully efficient in relieving the pain between the shoulders." He who has paid heavily for his whistle must needs blow it loudly.

The nervous woman will always swear by her favorite quack if he possesses, as often he must if he is to succeed at all, that indefinable something that enables some men to lead their fellows, to command them, and to heal them. For innumerable persons, not only with functional but also with organic troubles, comfort and hope in illness depend on the finding of this particular personality in the physician. Given this power, the healer can commonly dispense with all knowledge of disease and its treatment. The quack is tremendously helped also by his lack of reserve when it comes to diagnosis and promise of cure. Thus I may be morally certain that an aphonia is hysterical, but if the slightest doubt creeps into my speech or my behavior with the patient I will fail to cure her: I will be handicapped by a scientific spirit and concern over my reputation for truthfulness, but the quack will not be so inhibited.

What can the medical profession learn from all this? In the first place I think we can say that all those physicians who hate and despise nervous patients, who don't care to be bothered by them, who cannot find it in their hearts to sympathize with them, and who will not take time to study their lives and their problems and to lead them out of their muddles must not attempt to handle them and must never complain when they go elsewhere, even to the quacks. Those big healthy physicians who do not know what nerves are and who cannot believe that the sufferings of the fatigued and the weak and the psychopathic are real should stick to the type of practice that they can do well, among the injured and the maimed and among those afflicted with definite organic disease.

The next thing that we physicians should do more often is to make a definite, clearcut and positive diagnosis. Instead of hinting that the trouble may arise in teeth or tonsils, in ovary or uterus, appendix, gallbladder, enteroptosis, or adhesions, let us more often, *after making a careful physical, roentgenologic, and laboratory diagnosis, say:* "Your trouble is primarily or wholly due to constitutional inadequacy or to combinations of this with psychopathy, fatigue, nervous tension, worry, unhappiness, insomnia, and poor habits of living and eating." (Obviously the meaning of these terms will have to be explained in detail and in simple words.) Often we must have the wisdom and the strength to say that even if the patient should have chronic appendicitis or adhesions or cholecystitis or enteroptosis or a retroverted uterus or amebiasis, these things can not possibly account for the widespread symptoms complained of, and particularly they can not possibly account for the prostration, the melancholia, the inability to be-

come adjusted in the community, and the inability to keep at work.

The most difficult art that the physician has to learn is that of making friendly contact with these people; of convincing them of his faith in them and the reality of their sufferings; of communicating his sympathy to them; of explaining in simple words and with simple parables the situation as he sees it, and of convincing them that it is useless to go on searching for a quick cure by medicine or surgery.

Often he must explain the nature of constitutional inadequacy, and, without offending or discouraging too much, he must point out that "the conquest of Fate is not always by struggling against it but through acquiescence" (Trudeau). These people must act much as do the tuberculous, who find health only as, for a time, or forever, they give up ambitions and learn to live within their means of strength.

The physician should be optimistic to the extent of pointing out that much of the best and finest work of the world has been done by physical weaklings who suffered much. Often he can point to the case of Darwin, who could never work more than a few hours a day but who thereby accomplished enough to remould the thought of his generation.

If a physician hasn't the special knowledge in a certain field of medicine that will enable him to assure the patient that the disease complained of is functional in type, then it will help greatly to call a sane and conservative consultant. Thus, although I may be almost certain that I am dealing with a cardiac or a sexual or pelvic neurosis I rarely commit myself until I have consulted with a cardiologist, a urologist or a gynecologist. The greatest business-getter for the quacks is now and always has been the physician who, with insufficient knowledge, and after an incomplete examination, makes the wrong diagnosis, and, what is much worse, the wrong prognosis. Every time a physician tells a well-to-do patient with functional troubles that he will die if he doesn't immediately submit to an operation, some quack stands to gain a fortune or some group of divine healers is enabled to build a larger temple.

It should be obvious to anyone that frail nervous patients who have been ailing for years are not going to be made over in a few minutes or days. Often it takes hours, or weeks even, to dig out of them an intelligible story, one that will enable the physician to understand the problems of heredity and environment well enough so that he can give suitable and practical advice.

And obviously it is useless in most cases to give advice and then send the patient forth to work out his own salvation. How can we expect a poorly endowed or an injured and poorly-working brain, unaided, to discipline and help itself? For weeks or months the patient will need help from the outside and he must be made to return at frequent intervals for observation, encouragement, and continued psychotherapy. Often he would refuse to pay for psychotherapy alone and hence this must be combined with some vehicle such as physiotherapy, heliotherapy, or hypodermic injections of sodium cacodylate. These measures are helpful in themselves but often their main value consists in bringing the patient back repeatedly under the influence of the physician. They are helpful also in keeping the patient busy and out of the hands of the quack during the period in which rest, better sleep, and better hygiene can get in their good work.

Not infrequently we physicians would do well to follow the strategy of the irregular practitioner and to promise a cure only after several months of treatment.

I have long felt that our failure to cure or even help many cases of nervous disease is due to the fact that our methods are now similar to those used 100 years ago in the fight against tuberculosis. Today we say to the man or woman with a few râles in the lungs, "Give up work, go to a sanatorium for a year or two and you will almost certainly get well." We physicians should be doing the same thing with many nervous wrecks but as yet we have not learned what can be done in this way; we do not know when sanatorium treatment is absolutely necessary, and we are not sure what the results would be if we were to insist on it. Worse yet, the necessary sanatoriums are not yet available. It is difficult enough to find a good one for well-to-do nervous or psychopathic patients, and it is impossible to find one for a poor patient. Society has built many asylums and hospitals for the insane but as yet it has barely noticed the problem of the human wrecks who are to be found in the twilight zones between the sane and insane and the employable and unemployable.

Twenty-five years ago, working in a free clin-

ic, I used to stand baffled and helpless before the problem presented by tuberculosis in a poor man or woman. Today society has come to our help in the matter of this disease and we can put such patients at rest in institutions equipped for their care and manned by experts. Perhaps some day society will come to the help also of the constitutionally inadequate, the neurotic, the mildly psychopathic, and the poorly adjusted, and then we physicians will obtain better therapeutic results. My only fear is that if society should ever attempt really to care for these many inadequate persons those of us who are healthy and able to work and pay taxes would never be able to supply the necessary funds.

I doubt if we can hope, in the next few generations, to see much abatement in the human desire for quackery. All that we physicians can do is to stop *driving* patients to the quack by showing them a lack of interest and sympathy.

I have pointed out some of the ways in which we might profit by studying the technic of the irregular practitioner. Perhaps we could run him out of business if we could cure all of the sick who come to us; but we cannot yet do this, and neither can he. He gains his reputation in the case of patients healed by the great *vis medicatrix naturæ*, but so, often, do we, and hence we cannot complain.

There is one place in which scientific physicians might well emulate the quack and this is in maintaining a more impressive and better equipped office. How on earth can an intelligent, neat, orderly-minded patient expect to be cured when she is ushered into a dirty unswept room with ancient furniture and a small amount of rusty equipment? And what is she to think of a man who goes about with dirty fingernails and a badly-frayed collar and who leaves on his desk a large pile of medical journals still in their wrappers?

Finally, we must do our bit in improving methods of education until faith in quackery and hocus-pocus will become impossible. Today we tend to close the open and avid minds of little children with dogmas and positive statements; in school we teach them to memorize and worship statements made in textbooks designed to conform to the prejudices of the more ignorant of school boards, in college we often supply them with teachers who have never caught the true spirit of science, and then we complain because, for the rest of their days, they do not base their behavior on an openminded, dispassionate analysis of facts and expert opinions.

The world is still waiting for a group of specialists trained to handle the problems of the neurotic, the psychopathic and the constitutionally inadequate patient, with or without organic disease. The psychiatrist is interested in the actually insane, and the neurologist is interested in patients with brain tumors and nerve degenerations; what we need is a group of practitioners who, to begin with, are generously endowed with gifts of leadership, intelligence, friendliness, kindliness, sympathy, understanding, and good judgment. Next they must be well grounded in all branches of medicine in order that they will not become lopsided and faddish, and finally they must have training in psychiatry, neurology, and social service.

I fear that in addition to patients' fees they will have to receive some financial reward from the community because they can care for only a small number of patients a day, and most of these will be too poor to pay adequately for the service rendered. Incidentally, what right has society to take as a matter of course the physician's age-long willingness to assume the care of human derelicts without expectation of pay or even public thanks or exemption from taxation? It is this sort of thing that has ennobled our profession, but the economics of practice is changing. Once a physician sat in his study at home and in a few minutes gave an opinion and a prescription. Now he sits in a downtown office and he and several assistants spend hours in making a diagnosis. The process costs much money, and soon, if physicians are going to earn a decent living, the community must in some way assume at least part of the expense of medical care given gratis or at greatly reduced rates to those many poor people who are too refined, too well educated, and too proud to go to the free dispensary or to the county hospital.

SUMMARY

Quackery persists and is strongly entrenched today, first, because it fits in with many of man's inherited beliefs and desires, and second, because the intelligence of the average man and woman in the country is low. The various motives which take men and women to the quack have been

analyzed, and places have been pointed out in which regular practitioners of medicine might learn from the irregulars. It is suggested that a new type of practitioner is needed and new sanatoriums designed to take care of nervous and psychopathic patients.

DISCUSSION ON PAPERS OF DR. WRIGHT, DR. RICHARDSON, DR. MICHAEL, DR. HOIDALE AND DR. ALVAREZ

Dr. E. L. Tuohy (Duluth): It is indeed a heavy assignment to attempt to open the discussion upon this very interesting group of papers and contribute to this group and to this society as I should. In tribute likewise to this audience and this society, it may be assumed that you are so well grounded in organic medicine and diagnosis that you are permitted to listen to a series of discussions upon functional states that presupposes you are able to rule out true organic disease, or, in the presence of true organic disease, to give it its correct evaluation, and then proceed with your humanity and emotions instead of with your intellectual science to relieve the patient.

I shall mention first the last speakers because, obviously, their comments are fresh in my mind. Gastroenterologists, I am sure, have taken note of that wise old Egyptian bird, because not a few have offered an enema with their bill.

Indeed, it would be totally unbefitting the historical aspects of medicine if in this series of discussions we do not take on a Rabelaisian trend.

As the good speaker, Dr. Hoidale, discussed Henry Ford's philosophy and his mechanistic impressions, I am also reminded (apropos of Alvarez' pronouncement of judgment in choice of a physician) of the lady who called a chiropodist to see her at her hotel and asked that he be sent up to her room. As she began to disrobe, he said, "Madam, madam, pardon me, I am a chiropodist."

She said, "Stop your noise, man, I know what I want. I traveled across the continent in a Ford."

As far as the historical aspects of medicine are concerned, I ask you to admit that the quacks were as highly developed and as skilled far back in history as they are today. Whereas we may borrow from the quacks some ideas, as the wise Dr. Alvarez has proceeded to do, I shall point out to you that Avicenna was as clever in psychotherapy as Charcot. Witness the story of the prince who presumed he was a cow and that he needed most of all to be put to death and his body consumed. Avicenna came a great distance and with great physical distress and discomfort to see him; and as he came in he said, "Ah, who brought me to see this obvious cow? This animal is in a wretched condition. This cow is in no state to be killed. Take it away, feed it, feed it well, and I shall return in six months and carry out the agreement." Subscribing to the excellent thesis of Dr. Wright this morning, the prince fed wisely, recovered his mental balance, and did not need to be put to death as a cow!

Some of the greatest quacks of all times have their counterpart, needless to say, in our own generation. We have had countless Paracelsi, of whom it might be said that "for the things their followers count them inspired we count them dumb, and for the things that some might count them inspired the mass assume them psychosed."

Through this series of papers this morning runs obviously the common denominator of fear. The impression might be that man would be better off if he could eliminate fear from his horizon. That is not true. The great psychologist, MacDougald, in a very timely discussion some years ago, drew attention to man's emotional state, and it was not a bad idea that we had preliminary to this symposium this morning the excellent discussion on allergy by Dr. Gaarde. As I interpret allergy, it is a situation in which we should not hold allergy as an entire menace but that we hold those individuals blessed who have what we might call allergic equilibrium or balance. So we may hold those individuals endowed in ordinary life, whose emotions are properly balanced off one against the other. As MacDougald showed, almost anything that we count a virtue may become a vice if it is crowded to excess. Thrift becomes penury, piety becomes a holier-than-thou aspect that ruins itself. Courage and fear must be set off one against the other because in the accumulation of judgment there is some other element that must enter in in order that with judgment one gains wisdom. In it all, man, whose conscience is his most sublime possession and is at the same time his greatest tyrant, needs most of all the element of reverence. So in the development of reverence and that attitude which causes him to pause and wonder rather than elevate himself in an attempt to dictate, comes the sound individual who uses his fears sensibly.

In fact, it is said that people who hold up banks and gasoline stations (they are the only people who can get into banks successfully at this time) have plenty of courage but they have absolutely no pity; they have no sense of judgment, or lack the ultimate feeling that one would expect to make kidnapping of the Lindbergh baby, for instance, impossible. Obviously, many citizens are emotionally inadequate, or at least they have lacked the emotional balance which makes them safe citizens.

As far as terminology is concerned, I confess I am a bit confused by Dr. Michael. If you share with me any of this confusion it is chiefly because we have not as yet absorbed the neurologist and the psychiatrist

into the bosom of the entire medical family. We need more, not less, of their vernacular.

I was interested in Dr. Richardson's paper, which he kindly sent to me, stating that the neurologist and psychiatrist are not likely to see very many cases of nervous patients such as so commonly come to the internist. Evidently people make the distinction themselves. Dr. Richardson makes the good point that when they have a fixed delusion in terms of their heart, he finds it difficult to lead them away from it, and likely a matter of "thirty or forty visits and long discussions with the individual may be necessary to draw them out of themselves." I have treated many people who are nervous in terms of their hearts, but rarely have I seen anyone who had the fixed delusion that his heart had turned to stone or to glass even though some have calcareous aortas and silicotic lungs.

It is obvious that many people live in terms of their gastro-intestinal tract; that they vegetate in that sense of the word. It is pleasing in retrospect to look back perhaps to the permanent interment of gamboge and aloin and a series of drugs that were freely used a few generations ago.

Do you ever stop to think of the immense amount of psychotherapy that is tied up with surgery? A review of gallbladder disease illustrates my point fully. Those who have carefully studied 500 to 5,000 cases of individuals operated upon for gallbladder disease soon found that there is very great difference in the end-results largely in terms of the neuropsychiatric background that obtains. I need not go into that because you are all thoroughly familiar with it.

There is a deal of psychotherapy involved which the surgeons have not borrowed from quacks; they have learned through definite experience that they must not equivocate; that the doubtful appendix is not doubtful to them; that this questionable gallbladder is anything but questionable, that it is a foul thing—safer in pickle than in the patient's bosom.

The eye, ear, nose and throat men open up with nasal speculum the recesses that run back into the sinuses and find the dreadful state that obtains. With that type of man the end-results of operations for deviation of the septum are better than for him who looks in and says, "Your septum is slightly deviated and I think it might help you if you had it straightened out."

Yield me this final word: we witness the kaleidoscopic changes that overwhelm because we are not able to quickly acquire adjustment to them. The older bases of faith, or hope for the future, are more or less shot to pieces. That faith that was largely based upon confidence in the will of God or in religion has come to extraordinary questioning. So far the intellectual folk have put nothing in its place. We have been tied up more or less with the church from the earliest origins, and the doctors have had the best following among people who have had the greatest confidence in their own faith.

As we look at this issue and as we sense it, the responsibility that comes back to physicians is heavier day by day, as we see people groping. It is not that inadequate folk are useless, because many of them have been the most useful people in the world, but we as physicians who sense their problems must, in addition to the science we need to administer and interpret, acquire much humanistic philosophy; and with the press of science and measurement our schools of medicine are not notably adequate in this field at this time. There has been altogether too much, in the training of our medical men of today, of propounding the mechanistic philosophy. Symposia given by groups as gifted as you have listened to this morning give promise of a future profession not less scientifically trained but endowed with broader qualities of understanding in the realm denoted by older generations of educators as the "Humanities."

MEDICAL PRACTICE IN NORWAY

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THE information set forth in this report has been obtained from Newsholme's "International Studies in the Prevention and Treatment of Disease," and also from personal communications with medical men and medical organizations in Norway.

Norway is divided into twenty districts, or communes, which comprise forty-three towns, twenty-four ports and 674 rural communities. Each commune has a health council, presided over by the district medical officer, who is appointed by royal decree.

At the end of 1927, Norway had 1,674 doctors and 892 dentists, as well as 1,070 students of medicine who were undergoing the required seven year training period.

The medical officer is the key to the entire medical work of each commune. He cannot be removed from office, is pensionable and supervises the medical practitioners, pharmacists, dentists, midwives, and assistant vaccinators. Most of the district medical officers are also engaged in private practice and in the rural districts are responsible for the medical care of poor persons.

This treatment is required from the medical officers at their dispensaries, and within the area three kilometers from the officers' homes, without remuneration apart from their official salaries. For distances exceeding three kilometers, they receive 6 kr., and rates for calls at further distances are fixed according to an official rate, and are paid by the State. No additional payment is received for treating indigent patients, but the municipality may give additional remuneration for this purpose. In the larger towns, with a population exceeding 15,000, the Stadsfysikus has not the duty of treating the poor, and special medical officers are appointed by the municipality for this work.

Of the total population of Norway, it is estimated that some 40,000 (about 14 per cent) are medically attended gratuitiously by the district medical officer, and it appears likely that about one-half of the total medical attendance of the community, including hospital care and sickness insurance, is at least partially at the expense of the communal funds. The district medical officers' work is supplemented by the provision of general hospital treatment. In 1927, there were 197 general hospitals having a capacity of 10,742 beds. In addition there were 4,376 beds for the tuberculous, 305 beds in lying-in hospitals, 138 beds for leprosy, 120 beds for alcoholics and 5,368 beds for the insane. There are 489 additional beds for epileptics and the feeble-minded. The larger hospitals have been provided by the county councils. There is one Government Hospital, the "Riks Hospitalet," in Oslo, acting as the University Hospital, for medical students. At this hospital, the heads of each department are University professors in the faculty of medicine. In Oslo, there is also a special clinic for cripples.

A nominal fee is charged to the patient at the State Hospital, the deficit being borne by the State. At municipal and county hospitals, somewhat larger fees are charged, and all deficits are taken care of by public funds. In rural districts the hospital accommodations tend to be centrally located. The hospital rate of payments range from 3 kr. to 10 kr. (75c to $2.50 per day); in most hospitals the rate of 5-6 kr. per day prevails, which includes any required medicines, dressings and the physician's services. In Oslo, the charge is 3 kr. per day, but the well-to-do may pay more for private rooms.

There seems to be a definite sentiment throughout the medical profession, that these extremely moderate charges lead to an over-crowding of the hospitals. Private hospitals are practically unknown. The hospital staff receives its salary from the municipality, county council or State. The surgeon also receives a fee for each operation. Private practice is allowed, but few have the time for it.

In 1925, there were 1,534 midwives in Norway, of whom 1,000 were official. They are required to give their services gratuitously to the poor, although they may also have private patients. Two schools have been maintained since 1888 for them; one at Oslo, and one at Bergen, where the course of training lasts one year.

There is a rapidly growing tendency towards the hospitalization of obstetrical patients, and the medical profession expresses no objection to the almost complete monopoly (93 per cent) of normal cases by midwives. Midwives also perform vaccination when appointed by the district medical officer.

All wage earners earning less than 5,200 kr. per year are protected by compulsory sickness insurance, and between 50 and 60 per cent of the total population is insured.

Sickness benefit is established after three days of incapacity and amounts to 60 per cent of the average daily earnings of the insured person. Each insured person had, on the average, 9.84 days of sickness in the year of 1924. In 1924 the total expenditure of insurance funds was as follows:

	Per Cent
Hospital Treatment	14.7
Medical Fees	26.6
Dental Fees	2.1
Physiotherapy and Medical Appliances	3.5
Traveling Expenses	3.8
Maternity Benefit	5.0
Administration	8.5
Monetary Benefit	25.8

There is one insured person for each square kilometer, and he has a free choice of doctor, although the doctor can accept or decline any patient.

Insurance companies pay 3.50 kr. for each office call and 5 kr. for home calls, but the doctor in private practice is usually paid 5 and 7 kr. for these respective services by the insured.

In Bergen, doctors are paid 4 kr. for the first consultation, and 3.50 kr. in the other districts;

2 kr. for the second, and 1.50 kr. for subsequent consultations, with an additional allowance for traveling. Special fees are set for special work. Traveling expenses are allowed in addition to the fixed payments per visit at the rate of 5 kr. for one kilometer, 6 kr. for three kilometers, 7 kr. for five kilometers, and 9 kr. for ten kilometers (kilometers equaling five-eighths mile).

In Norway, the fact that the patient has to pay for drugs gives the doctor a motive for discouraging over-medication and unnecessary prescribing. The cost of medical treatment in 1928, which included special services of all types such as skilled obstetrical care, etc., was 14.2 kr. per family.

Of the cost of sickness insurance, six-tenths is paid by the insured, one-tenth by the employer, one-tenth by the municipality, and two-tenths by the state.

Dr. Peter Bull, in a letter to the writer, stated that at the present time the undergraduate medical situation in Norway is serious, inasmuch as the number of students is greater than can be taken care of for clinical purposes at the University Hospital, the hospital being able to care for only fifty students each half year. The result is that many of the students who have passed their examinations find it necessary to wait for two years before they have the opportunity to complete their hospital and clinical education.

The cost of the University course approximates, I should say, that at our own University. The costs, according to the Secretary of the University of Oslo, to the medical and other students in Oslo, for room and board, are approximately a minimum of 100 to 125 kr. per month, the student usually preparing his own breakfast and supper and having dinner at a restaurant, for this meal, according to Norwegian custom, as in some parts of the United States, is the most substantial of the day.

The Secretary of the Norwegian Medical Society informs me that an insurance arrangement among the members, the cost of which is much the same as any private insurance, pays 1,000 kr. at death, or at ninety years of age. However, a surplus has permitted the payment of a bonus as high as 200 kr. for each 1,000 kr. policy. There is also an institution for the benefit of Norwegian physicians or their dependents, organized outside of the society, which depends mostly on bonds, legacies, or money willed by wealthy individuals. He claims that the cost of medical education in many instances is exceptionally small, so that many of the students are now derived from the lower ranks of society, and have no funds. The men who graduate may begin practicing at any place they choose. They frequently become assistants to some of the better known physicians, and finally wait for a government position, but the difficulties for obtaining these increase each year. He further states that due to the economic crisis of the world, which is no less in Norway than elsewhere, the income of the Norwegian medical man has constantly gone downwards, and that, for 1930, the income for the average practitioner in Norway from the so-called sick benefit society or practice, has probably reached 6,300 kr. gross. If the income from private practice is included, the income probably does not average over 10,000 kr. per year.

Norway has social insurance of several types: (1) accident; (2) sickness; (3) invalidity and old age; (4) unemployment.

It is only within the scope of this paper to give a résumé of accident insurance. The funds are sufficient to cover the benefits and defray the costs of administration, and are created by way of premiums, which are paid entirely by the employer semi-annually in advance. The different activities are classified by the nature of the risk and the rates of the premiums are figured on 1,000 kr. annual wage, and vary according to the class of the risk. The lowest rate is 2 kr. and the highest 150 kr. The benefit to the insured in case of sickness begins the day after the accident and consists of free medical attendance and a sick benefit consisting of 60 per cent of his wages for full indemnity, and a corresponding fraction if only a portion of his working ability has been lost. If the accident results in permanent disability, the insured will, at the conclusion of medical attendance, receive 60 per cent of his full wages, but he is not entitled to any benefit if the resulting loss is less than 5 per cent of his earnings. When the loss is less than 12 per cent, he will receive a sum equal to three years benefit once and for all. If the accident causes death, the survivors receive 75 kr. to defray funeral expenses, and 20% of the deceased's wages will be paid the widow or disabled widower, and 15 per cent for each child under fifteen years of age, the total not to ex-

ceed 50 per cent. No worker may receive more than 60 per cent of a wage up to 2,000 kr. and each worker receives a pension, therefore, of 1,200 kr. per year. There is also an accident insurance for fishermen, whalers, and seamen, and this insurance is paid entirely by the owner of the ships.

Compulsory sickness insurance was established in Norway by law in August, 1909, taking effect in 1911, and has since been amended. The law provides that every employe over fifteen years of age is entitled to insurance providing his salary is not more than 4,500 kr. per year. Every person over fifteen years of age and under seventy is at liberty to subscribe for voluntary insurance in the local sickness funds, on the condition that he is in good health and that his income (inclusive of that of his wife) does not exceed 4,500 kr.

Old age pension is also provided in Norway, and is maintained by taxation. To obtain this pension a person must be over seventy years of age, and furnish proof that at the age of 16 he was a resident of Norway at least half of the time, and permanently during the last five years, or had sailed a Norwegian boat, or had been employed by the Norwegian government abroad. Payments are made by the Pensioner's Residential Municipality, though the government reimburses it for 50 per cent of its expense. A maximum for any single individual is 300 kr. and for a married couple 450 kr.

At the present time, there is no unemployment insurance in Norway although some of the labor unions may, through authorization, obtain from the State Treasurer one-half, and in some cases two-thirds, of the money with which they support their unemployed members, who reside in Norway, providing they are Norwegian citizens and have resided there at least two years. At least one-half of the fund must be levied on the members in the form of dues. In order to obtain benefit, one must have been a member of the union and have paid dues for at least twenty-six weeks, and have, through no fault of his own, been unemployed for at least three days and not on account of labor conflicts. In case of unemployment, the members shall take the work to which they are assigned by the Board. Benefits shall not exceed 50 per cent of the average wage and shall not last for longer than ninety days during one year. An applicant must have made a futile attempt to obtain work from a public employment office.

Mr. Arthur Newsholme states that the system in Norway is admirable and is only possible because of well organized communal cooperation. When one remembers that Norway is a sparsely populated country, that the people are relatively poor, the distances great, and transportation difficult, one must admire and respect the work that is being done by the Norwegian people. It must be remembered that it is as far from Oslo to North Cape as it is from Oslo to Rome, and that it takes longer to reach the most northerly point of Norway than to cross the Atlantic Ocean. Also, Norway is a very barren and mountainous country. Of its area of 124,964 square miles, 29,000 are forests, and only 3.2 per cent is under cultivation, the rest of the country being unproductive. Forests constitute one of its chief natural resources, and next to this come fisheries. It has enormous water-power, which has been utilized as yet in only a relatively small degree.

NASAL CATHETER SUCTION SIPHONAGE: ITS USES AND THE TECHNIC OF ITS EMPLOYMENT*

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THE duodenal tube has become an important agent in the armamentarium of the physician who diagnoses and treats abdominal ills. It is with the use of the duodenal tube in the relief of distention of the intestinal canal that this article concerns itself.

General indications.—It is more than twenty years since the duodenal tube was first employed in the relief of postoperative distension. At the University Hospital, we have found the employment of the duodenal tube, with suction, efficacious in the control of postoperative nausea, vomiting and distension as well as in the treatment of reflex and inhibitive (paralytic) types of ileus and in certain types of acute mechanical intestinal obstruction.

The nature of intestinal distention.—The occurrence of intestinal distention in the presence of a mechanical block in the intestine is easily understandable. Following operations upon the abdomen, a paresis of the intestine of varying grade is the rule. In consequence, the motility of the gut is compromised and intestinal secretions and gas accumulate in the stomach and intestinal canal. McIver and his associates have adequately demonstrated that the gas of postoperative distention is, essentially, swallowed air. Reflex inhibition of motility of the intestinal canal with ensuant distention, often of severe grade, is seen frequently in peritonitis; retroperitoneal collection of blood, urine or pus; accompanying fractures of the upper dorsal spine with spinal cord injury; less commonly in fractures of ribs or the pelvic bones, uremia, renal colic and other states.

Mechanical and physiological factors determining the efficacy of nasal catheter suction siphonage.—It is our impression, from observation, that a duodenal tube placed in the stomach does not keep that viscus continuously empty. Only as the stomach fills does the siphonage intermittently become effectual. The attachment of the duodenal tube to a Marriotte bottle permits collection of both the aspirated gas and fluid and its action can be made to duplicate the siphon action of the duodenal catheter when placed in a receptacle over the bed. By alternating the employment of this apparatus with the nasal catheter suction siphonage as will be shortly described, one may soon convince himself of the superiority of suction. The latter keeps the stomach continuously empty.

The small intestine is an elastic tube about 20 or more feet in length. The activity of the pyloric sphincter interrupts the continuity of the stomach and small intestine as a single simple tube. Not uncommonly this sphincter fails to present a physiologic block for decompression by suction of the small intestine when the tip of the duodenal tube is in the stomach. One is, however, more certain to succeed in evacuating the contents of the intestinal canal as well as the stomach, when the catheter finds its way through the pylorus into the duodenum. We have made it a practice, therefore, to cut extra holes in the duodenal tube as far back as 10 inches proximal to the eye of the catheter. With the end of the catheter in the duodenum, continuous suction may then be exerted upon the intestinal canal and stomach. In postoperative cases, it has not been necessary, ordinarily, to make an effort to get the tube through the pylorus. In mechanical obstructions, if the intestinal colic does not stop soon after the institution of suction, or if an X-ray film of the abdomen taken some hours later fails to show diminution in intestinal distention, deliberate attempts are made to induce the catheter to go through the pylorus. The patient is turned on his right side in an effort to get the end of the catheter in the proximity of the pyloric canal. He is then given a few sips of water and is instructed to inhale the fumes of two "pearls" of amyl nitrite, broken in a handkerchief. This procedure may be repeated at intervals of an hour or more. The character or the increased amount of the aspiration and subsequent X-ray examinations will serve to indicate that the catheter has found its way into the duodenum. Occasionally, in mechanical obstructions, we have employed the Refuss tube with the weighted tip and have visualized its

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presence in the vicinity of the pyloric canal with the fluoroscope. By the use of gentle abdominal massage, sips of water and the inhalation of amyl nitrite, the catheter can usually be made to enter the duodenum. Because of the stimulating effect of morphin upon the pyloric sphincter, its administration in mechanical obstruction, in which disorder difficulty may be encountered in getting the tip of the catheter into the duodenum, is interdicted. The local application of continuous hot, moist packs to the abdomen, we feel, is an adjuvant measure of real value in all cases with considerable distention.

In the intact dog or in the human gut excised at necropsy, it may readily be demonstrated, following the introduction into the gut of a gas (air) or fluid (water), that the exertion of suction on one end is immediately appreciated in the same degree at the other end. When, however, a mixture of gas and fluid is present, the difficulty well known to physicists whether dealing with rigid or elastic tubes comes into play. In simple gaseous or fluid distention, the entire gut may be decompressed almost at once. When segments are found alternately distended with gas or fluid or an intimate admixture is present the decompression will be only slowly effected.

A turbulent gut, as obtained in mechanical obstructions, is more readily decompressed than one in which all motility is inhibited as in the ileus of peritonitis. Alteration of the relative position of the coils of gut as obtained by a change in posture serves to separate gas and fluid in the individual coils and may be utilized in some degree to facilitate decompression. The degree of suction which may be utilized in an elastic tube is limited by the engagement of the gut wall in the holes of the catheter where the suction is applied. Even with mild suction this phenomenon may be demonstrated. We began by using about 75 centimeters of water suction and believe this figure to be somewhere in the range of the optimum value.

Results.—Our impressions of the value of nasal catheter suction siphonage in the treatment of mechanical types of obstruction, and in the treatment as well as prevention of postoperative distention, nausea and vomiting have been published elsewhere.[2,3,4,5] The method has been employed on more than 400 patients on the surgical service at the University Hospital. After operations upon the stomach, gallbladder or bile ducts, in which postoperative distention is frequent, nasal catheter suction siphonage is routinely employed. A recent check of the hospital records shows that the incidence of vomiting, in instances of peritonitis, has been reduced from 90 to 15 per cent through the employment of suction with the duodenal tube, emphasizing the significance of stasis in the gastro-intestinal canal in the genesis of the vomiting of peritonitis.

In mechanical obstructions, the method is especially valuable in adhesive types of obstruction, in which, following decompression of the gut, its continuity is established automatically. As an adjunct measure it may be used in many other types of bowel obstructions. Its use as the sole method of treatment is contraindicated in strangulation types of obstruction, which are to be recognized in the presence of signs of peritoneal irritation; and in obstructions of the left half of the colon in which the distention is limited by the competent proximal ileocolic sphincter to the colon alone. In these two varieties of obstruction, immediate operation should be done; in the former the agent threatening the viability of the intestine must be dealt with; in the latter, the colon should be decompressed. It has been our experience that the majority of adhesive types of obstruction of a simple nature may be effectually managed by nasal catheter suction siphonage alone. In instances in which the obstructive mechanism does not relent after decompression, permitting the automatic re-establishment of the continuity of the intestine, operation is indicated.

Description and operation of the apparatus.—The apparatus consists of the following articles:

a. Two large glass bottles, graduated and holding 4,000 c.c. (24 hr. urine specimen bottles).
b. A two hole rubber stopper which fits one of the bottles snugly.
c. A Levin duodenal tube, No. 16 or 14 Fr. (No. 16 Fr. is preferable) with the perforations continued up from the tip 9 or 10 inches.
d. A canvas sling to hold one of the bottles inverted.
e. An irrigation standard.
f. About 8 feet of ¼ or ⅜ inch rubber tubing.
g. Two ¼ inch glass tubes, 4 and 14 inches long.

h. A screw clamp.

The canvas sling is fitted over one of the bottles and this bottle is filled with water. The glass tubes are so placed in the rubber stopper



Fig. 1. Photograph of a patient upon whom a successful decompression of the bowel by nasal siphonage was obtained for acute mechanical obstruction (postoperative adhesive), showing the apparatus in operation.

that the longer glass tube will extend almost to the bottom of the bottle and the shorter glass tube will extend just through the stopper into the bottle (see Fig. 2). The rubber stopper is then fastened securely in place as indicated in the diagram.

Four hundred c.c. of water is placed in the bottom bottle on the floor at the foot of the irrigation standard.

Four or five feet of rubber tubing is attached to the shorter glass tube and the distal end placed beneath the surface of the water in the bottom bottle. The remainder of the rubber tubing is attached to the longer glass tube and clamped with the screw clamp.

The top bottle is hung inverted from the irrigation standard at a height of 5 to 6 feet. The thumb is placed over the free end of the rubber tubing attached to the longer glass tube and the screw clamp loosened. If suction is perceived immediately, the apparatus is ready for use. If it is not perceived, only one thing can be wrong —there is air in the rubber tubing leading down to the bottom bottle. This can easily be remedied by injecting a few c.c. of water through the tubing attached to the longer glass tube. As soon as suction becomes manifest the rubber tubing should be clamped until the duodenal tube has been inserted. The suction apparatus should be checked for leaks before attaching the duodenal catheter.

Inserting the duodenal tube.—With a little care a Levin duodenal tube can be passed through the nose and into the stomach without causing the patient to gag, choke or retch. Patients should be instructed, however, to breathe rapidly through their mouths if they experience any tendency to do any of these.

The duodenal tube should be lubricated with mineral oil or glycerine and the tip inserted through one of the nares into the posterior nasopharynx, but not far enough to cause the patient to gag. The patient is then asked to take a mouthful of water and hold it in his mouth. The patient is instructed to swallow slowly and as he swallows, the tube is slowly inserted. When the patient has swallowed the water held in his mouth, no effort is made, momentarily, to push the tube further. The patient is then allowed to drink water freely and instructed again to swallow slowly and as he does the tube may be inserted as far as is desired.

When the tube has been inserted and adjusted it is fastened to the patient's upper lip and cheek with adhesive tape, and connected with the suction set. When the clamp is unscrewed the apparatus is in action.

If the tube remains in place for more than a day or two the patient may complain of it making his nose or throat sore. This can be remedied to a great extent by applying argyrol or nasal oil locally two or three times a day. We have had patients in whom alternating suction and feeding has been done through the tube for more than a week and who have not complained. In one instance the tube was *in situ* for more than six weeks.

When the duodenal tube is put into the stomach it should be adjusted so that it completely empties the stomach. This can be tested by injecting a small amount of water through it with a syringe and trying to re-aspirate. The stomach should be free of coarse food particles if good results are to be expected from suction. If, from time to time, the tube becomes plugged with heavy mucus, food particles or intestinal content, it can be cleared by injecting a few c.c. of water through it with a syringe.

Measuring the aspirated fluid and gas.—The apparatus works on the principle that water tending to run from the top bottle to the bottom bottle creates a vacuum in the top bottle which is transmitted through the long glass tube and hence to the duodenal tube. Therefore, if water runs out of the top bottle an equal volume of gas or fluid must run in. To measure these quantities is quite easy and very important for maintaining the patient in a positive fluid balance.

The bottles are graduated in 200 c.c. gradations and are started with the top bottle full and with 400 c.c. of water in the lower bottle. The reading on the graduated scale of the water level in the top bottle is the amount of gas aspirated. The reading of the water level in the bottom bottle is the sum of the 400 c.c. of water present at the beginning, plus the amount of gas

Suction apparatus used in certain cases of intestinal obstruction
University Hospital · University of Minnesota

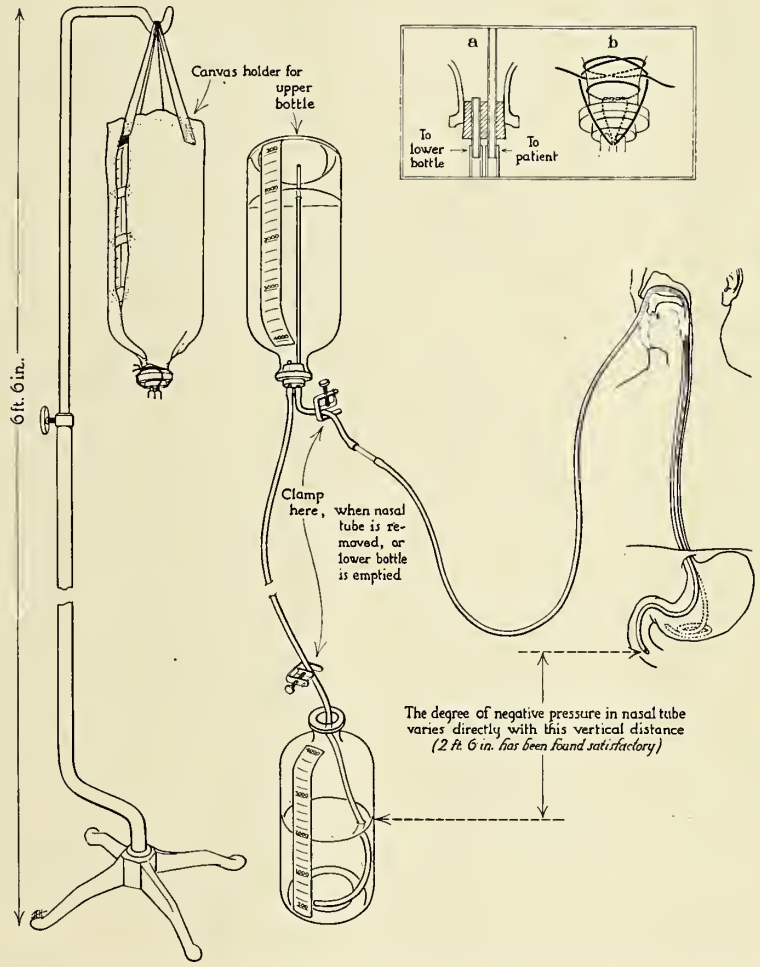


Fig. 2. Sketch of the apparatus; the bottle is inverted so that the gas may be collected and measured as well as the fluid.

aspirated, plus the amount of fluid aspirated. The last quantity can be found by simple subtraction.

The administration of fluid during the continuance of suction.—It is important to maintain a positive fluid balance by the para-oral administration of fluid. Postoperative patients are permitted 2000 c.c. of water by mouth each twenty-four hours. It is believed unwise to allow them unlimited quantities of water by mouth because of the dechlorinating effect of the washing of the stomach with freely ingested fluids. Patients with mechanical obstruction are not permitted water by mouth, save for the small quantities necessary to facilitate the passage of the tip of the catheter through the duodenum. These patients are permitted to suck ice and slices of lemon sweetened with sugar to stimulate the flow of saliva.

The fluid balance is maintained meanwhile by the subcutaneous and intravenous administration of fluids (normal saline and 5 per cent glucose solution). The urine output is a good criterion of how much fluid should be given and we have found it to be a very practical and reliable estimate of the fluid balance. If the daily urine output is maintained at 700 to 1000 c.c. one may feel certain that the blood chlorides are normal. It is usually necessary to give 2500-4000 c.c. of fluid by the para-oral methods to insure this urinary output.

After the suction has been operating successfully for twenty-four hours or more in postoperative patients, it may be interrupted intermittently by clamping one of the tubes. Not infrequently patients will complain of distress when the tube is clamped and beg to have it released or will unclasp it themselves. When the patient can tolerate interruption of suction for an hour or more without complaint, he may be permitted clear fluid by mouth (such as grape juice, strained orange juice, ginger ale, tea, etc.). Milk cannot be given because it clots in the stomach and will plug the tube when suction is restarted. When suction is employed in the relief of intestinal distention whether due to mechanical or inhibitive factors, the interruption of suction is to be determined by the progress of the decompression. The tube may be removed when interruption of suction can be done without complaint, and when feedings are tolerated.

Summary.—The uses and technic of employing nasal catheter suction siphonage are described. The mechanical and physiological factors that influence decompression of the distended intestinal canal are discussed and the value of the method in the control of postoperative nausea, vomiting and distention, as well as in the treatment of intestinal stasis of both mechanical and inhibitive origins are outlined.

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THE DIAGNOSIS OF LARYNGEAL DISEASE*

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THE list of laryngeal diseases is long. Over forty different pathological conditions entirely local in origin or related to a disease process elsewhere have been described. About half of this number are common. On the whole, those conditions more common to early life are usually suspected promptly, receive adequate treatment, and when uncomplicated end satisfactorily.

You will recall that the larynx has the structural form of an inverted, triangular, pyramidal tube, the framework of which consists of the large thyroid cartilage atop the sturdy cricoid ring (Fig. 1). On the posterior rim of this cricoid ring set the two arytenoid cartilages, "hitching posts" for the vocal cords, which stretch across the laryngeal lumen. The muscles which control these cords abduct, adduct, and tense them (Fig. 2). Most textbooks teach that the main tensors of the vocal cords, the crico-thyroid muscles, receive their innervation from the superior laryngeal nerve, and that all the other muscles are supplied by the inferior (recurrent) nerve. Recent studies in an attempt to explain the midline position of a vocal cord after accidental section or injury in neck surgery have shown that the superior laryngeal nerve is also the principal motor supply of the arytenoideus muscle (Nordland).

The symptoms in all varieties of laryngeal disease may be essentially the same; a manifestation of disturbance in the functions of phonation and respiration. To these may be added a disturbance in deglutition brought about by the swelling and inflammation incident to disease involving the external portions of the larynx.

Probably the most common condition in the larynx of serious importance in the adult is a unilateral cord paralysis, not particularly serious insofar as the larynx itself is concerned, but an indication of what is usually a grave condition in adjoining structures. Unilateral paralysis of neurogenic origin is brought about by a number of conditions. It is more common on the left side than on the right, due to the longer course of the left recurrent nerve (Fig. 2-C). The development of this paralysis follows a certain course described long ago by an English laryngologist (Semon): "In all progressive organic lesions of the centers and trunks of the motor laryngeal nerves, the fibers supplying the abductors of the vocal cords become involved much earlier than do the adductors. When paralysis is confined to the adductors of the vocal cords, it is almost invariably bilateral and is due to functional changes in the central nervous system."

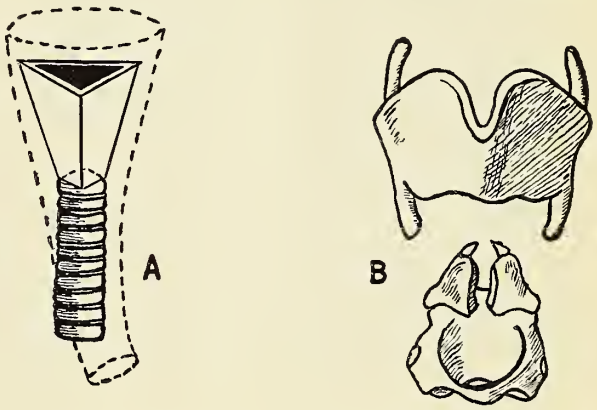


Fig. 1. Diagrammatic representation of: *A*—Form of the larynx; *B*—Thyroid, cricoid, and arytenoid cartilages (after Turner).

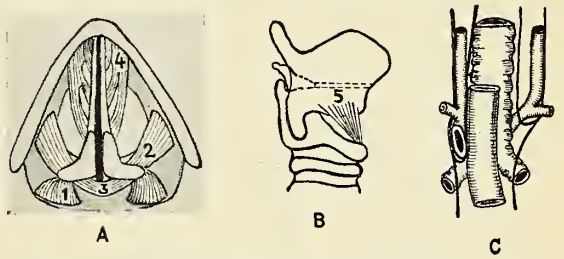


Fig. 2. *A*—Schematic diagram of the intrinsic musculature of the larynx: (1) Posterior crico-arytenoid muscle; (2) lateral crico-arytenoid muscle; (3) arytenoideus muscle; (4) thyreo-arytenoid muscles (after Wood). *B*—(5) Cricothyroid muscle (after Turner). *C*—The relations of the recurrent laryngeal nerves in the neck, illustrating the longer course of the left nerve winding around the arch of the aorta (after Turner).

It is not within the purpose of this paper to consider all the varieties of laryngeal paralysis. In the hoarseness due to a simple catarrhal process, the paralysis is due to a myopathic involvement of the thyreo-arytenoid muscles. Functional causes as a source of hoarseness or aphonia is

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due to a bilateral loss of adduction power. In addition to these, a peripheral neuritis may affect the recurrent or superior laryngeal nerves, causing a paralysis, but the most common source of a loss of abduction of a cord is the result of in-

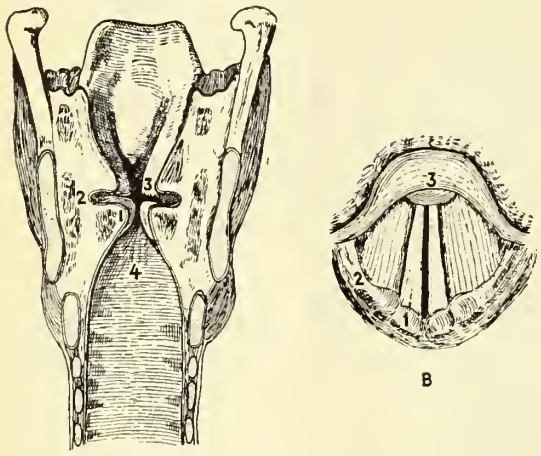


Fig. 3. *A*—Sketch of a vertical lateral section of the larynx showing: (1) Vocal cord; (2) ventricle; (3) ventricular band. These compose the *intrinsic* area. The *subglottic* area is indicated at (4). *B—Sketch* of the glottis viewed from above showing the *extrinsic* area: (1) Arytenoids; (2) ary-epiglottic folds; (3) epiglottic. The piriform sinuses and the postcricoid area are not shown (after Thomson).

terference with the recurrent nerve in its course, either through pressure or destruction. Rarely is this paralysis bilateral. The attributed causes of paralysis of neurogenic origin (vagus or recurrent) are:

On the left:

1. Aneurysm of the arch of the aorta.
2. Enlargement of the left auricle.
3. Pericarditis.

On the right:

1. Pleural thickening at the apex of the right lung.
2. Aneurysm of the innominate artery.

On either side:

1. Enlarged cervical or bronchial glands.
2. Goiter.
3. Diseases of the mediastinal tissue or glands: carcinoma, sarcoma, tuberculosis, syphilis, etc.
4. Direct traumatic injury in surgery of the neck.
5. Intracranial growth at the base of the brain, or a growth in the neck involving the vagus at its exit from the skull.
6. Cervical phlegmon.
7. Aneurysm of the carotid artery.
8. Large pleural effusions.
9. Bulbar lesions.
10. Peripheral neuritis.

The picture is not difficult to recognize. One cord fails to move or adducts slightly and the other cord tends to overact. It is important to watch the arytenoid movement rather than the cord itself, as one may be misled by some movement of the cord due to the passage of respired air and an illusion produced by watching the active healthy cord.

From all standpoints, the most serious laryngeal affection of adult life is cancer. It is not uncommon. Cancer of the larynx is said to account for about 5 per cent of all malignant disease. Tumors of the larynx occurring before the age of forty-five are chiefly benign, although a number of epitheliomas have been reported in ages ranging from fifteen to twenty-five years. Most of the malignant new-growths are epitheliomas; occasionally one sees a sarcoma or endothelioma. Benign tumors are usually papillomas; less commonly fibromas and angiomas occur.

The exact location of cancer in the larynx is extremely important. Because of this we classify it in two main types: (1) intrinsic (starting within the larynx); and (2) extrinsic (originating on the outer surface). To these may be added a third type, subglottic, which borders on the intrinsic, and a fourth group known as mixed.

INTRINSIC CANCER

Intrinsic cancer begins on the cord, in the ventricle, or on the ventricular band above (Fig. 3-A). It is the most common type of laryngeal cancer. The most frequent site of origin in the intrinsic area is on the free margin of the cord. Voice change, therefore, occurs very early in the evolution of a growth in this area. Nature has fortunately arranged the lymph drainage so that the intrinsic area, and especially the true cords, are practically isolated (Fig. 4). An epithelioma originating on the anterior two-thirds of one cord characteristically extends along the cord toward the commissure. It may remain localized to the cord for months. Cases have been reported in which the period of observation has extended over several years before there was extension outside the intrinsic area and subsequent rapid diffusion. The early appearance of cancer originating on the cord may be that of a slight thickening, with injection of the localized area. As the growth proceeds, hypertrophy becomes more pronounced and there may be retraction and cupping in the most prominent part

of the swelling, followed by ulceration. There is a tendency for it to grow subepithelially. Fixation of the cord is a late sign in the course of the disease.

When the growth originates in the ventricle, or on the ventricuular band above, interference with the function of the true cord will not occur so early. These locations are the uncommon ones of the intrinsic disease. Considerable extension of the growth may have taken place before any significant symptoms are manifest. The early appearance is that of a swelling, with injection of the ventricular band. Within the ventricle, the tumor must grow to the extent of an outcropping from this pocket to be apparent.

The treatment of intrinsic cancer limited to the anterior two-thirds of a vocal cord may result in cures in over 80 per cent of cases. The operation of laryngo-fissure with preservation of the healthy cord and a useful voice is the treatment of choice. Surgical mortality in this operation has practically been erased. A more extensive surgical removal, laryngectomy, is necessary when the ventricular band or ventricle is involved, in intrinsic cases when there is fixation of the cord, and when there is extension of an intrinsic growth back to involve the posterior third of a cord, or onto the epiglottis or subglottically. This operation carries a surgical mortality of less than 5 per cent in competent hands, and accounts for cures in 90 per cent when limited to late intrinsic cases. The patient in these cases must resort to artificial aids for the production of speech.

Subglottic growths offer difficulty of detection in early stages because of their obscure location. When extension into the overlying cord occurs, a paresis of the cord may become evident. About the only symptom in the early stages may be the patient's occasional complaint of "cold in the throat," and especially of difficulty in clearing the throat. Gradual onset of a slight dyspnea and stridor on exertion occur when the growth encroaches on the respiratory space. Some of these cases are amenable to cure by laryngofissure, but most of them require a total laryngectomy.

EXTRINSIC CANCER

Cancer originating on the outer surface of the larynx (Fig. 3-B), the epiglottis, the aryepiglottic folds, or on the arytenoids presents a different story. The symptoms in contrast to the intrinsic type are insidious and vague. It makes its presence known chiefly by local discomfort. Early detection is uncommon. Unless the profession suspects in persons of cancer age the possibilities of minor discomforts localized to the general area of the larynx, there is little possibility that we will ever see these cases in their incipiency. These minor discomforts are chiefly: (1) an inability to rid the throat of an increasing amount of secretion; (2) discomfort in swallowing, and (3) any sensation of dryness, or of irritability, or of "something stuck in the throat."

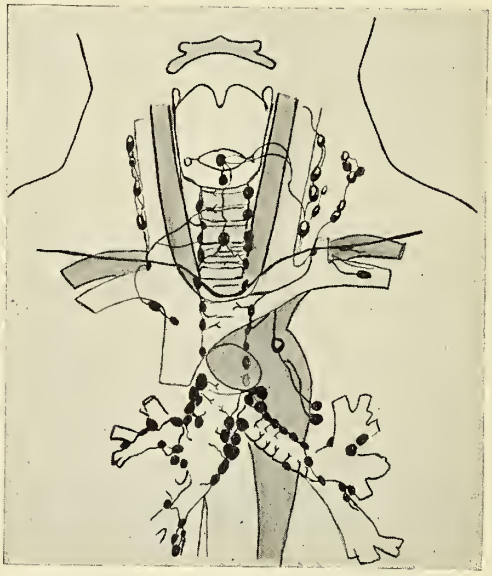


Fig. 4. The lymphatic drainage of the larynx and trachea (after Hajek).

As the disease progresses the discomfort becomes an actual pain, generally unilateral, with a tendency to radiate up the side of the neck to the ear. It is increased on swallowing. Dysphagia steadily increases. Hoarseness, stridor, and dyspnea occur as the endolarynx becomes involved. Glands in the neck are usually prominent at this stage. Fetor, discharge, loss of weight and cachexia follow.

Lesions in the piriform sinus and on the post-cricoid surface are usually classed as extrinsic laryngeal growths, but belong as much to the hypopharynx and esophagus. The symptoms produced by a growth in the piriform sinus are those above described; in the post-cricoid area, the chief symptom is one of deglutition.

Because of its rapid extension and late rec-

ognition, cures in cases of extrinsic cancer are rare. The extensive surgical removal by lateral pharyngotomy has resulted in a small percentage of cures. The surgical mortality in this operation approaches 50 per cent. The usual treatment is with radium implantation and X-ray therapy.

Mixed (intrinsic and extrinsic) cancer, as the name implies, originates in the endolarynx and extends beyond, or vice versa. Less commonly, the extension is from without inward. The incidence of cure in these cases is small. The operation must be a total laryngectomy in selected cases, or a lateral pharyngotomy with wide excision of the growth and the glands.

DIFFERENTIAL DIAGNOSIS

Cancer of the larynx must be differentiated chiefly from chronic laryngitis, keratosis, pachydermia laryngis, syphilis, tuberculosis, benign growths, and laryngeal paralysis.

A chronic laryngitis presents generalized changes. Rest of the voice, abstinence from tobacco, and improvement in naso-pharyngeal disease usually bring changes for the better. A continued observation during a period of several weeks will usually bring significant changes in the suspected area. Keratosis is a rare condition but may be confounded with malignancy. It appears as a patch or patches, chalk white in color and usually widespread in distribution, over one or both cords. Mechanical removal and treatment with 10 per cent salicylic acid in alcohol is effective. In doubtful cases a biopsy settles the question. Pachydermia laryngis likewise is a rare disease. Pathologically it consists of a proliferation of the epithelium with multiplication of the papillæ. It may involve the true cords or the interarytenoid region. The usual picture is a symmetrical swelling on the posterior end of each cord, with crater-like excavation on the surface of one into which the apex of the swelling of the opposite cord fits on phonation. Benign growths offer no particular diagnostic problem as a rule. The chief differential points, according to Thompson, are shown in Table I.

The affections which are most likely to tax the diagnostic ability of the observer are tuberculosis and syphilis, either of which may closely simulate malignant disease. The chief characteristics in this triad are shown in Table II.

A unilateral abductor paralysis or complete recurrent paralysis occasionally appears to be accompanied by more than the normal prominence of the false cord above, and by a low grade laryngitis.

TABLE I

BENIGN	MALIGNANT
Rare after 50.	Rare under 45. Generally occurs over 50.
	Occurs anywhere on the vocal cord or elsewhere.
	A solitary growth on the aryepiglottic folds or epiglottic is very suspicious in patients over 45.
Grows away from tissues.	Invades tissues.
Base of growth or cord it springs from only inflamed during laryngitis.	Inflamed base.
May impair action of cord mechanically.	Any impairment due to infiltration strongly suspicious.
No ulceration.	Tendency to ulceration.

The diagnostic measures necessary to determine the pathology present in laryngeal disease are not elaborate. Foremost is the careful use of the laryngeal mirror. This is an art that seems generally to have been lost or left entirely in the hands of the laryngologist. It has been my frequent experience to be confronted with cases of laryngeal malignancy which have been treated for months with the sprays and gargles in common usage without having any examination beyond simple inspection of the posterior pharyngeal wall. Direct laryngoscopy, a relatively simple procedure, supplements the indirect examination with the mirror when doubtful evidence of serious disease exists, or to determine properly the extent of a suspicious lesion, and to procure, when indicated, a biopsy.

SUMMARY

Serious laryngeal disease in its incipiency must be considered in patients over 45 years of age who present symptoms of:

1. A huskiness, or hoarseness, or easy fatigue of voice.
2. Inability to "clear the throat of phlegm."

TABLE II

TUBERCULOSIS	CANCER	SYPHILIS
Most common; decreasing.	Common; increasing?	Primary and secondary rare. Tertiary common.
Ages 20 to 40.	Usually after 45.	After 45.
Sex about equal.	Much more common in males.	Males.
Voice weak, hollow, and painful.	Voice strong, rough, and painless.	Voice hoarse and raucous.
Often associated with the general physical appearance of active pulmonary tuberculosis. Pulmonary disease is invariably present.	General sense of well-being in the earlier stages.	Same as in cancer.
Pallor of pharynx and larynx suggestive. Characteristically attacks the arytenoid and interarytenoid area.	Intrinsic: Usually starts on free margin of cord; also on the ventricular band and in the ventricle. At first a thickening; progresses to a retraction or cupping in most prominent part of the swelling, then to ulceration and fixation of the cord.	Edema prominent. A dusky laryngeal congestion. In gummata, surface rounded, often irregular, deep red and purplish. When ulcerated it is deep, irregular, and punched-out with crater-like, sharp edges and inflamed areola.
Ulcerations multiple, superficial, shallow and ill-defined.	May resemble a sessile tumor, as a benign fibroma, etc.	
"Tuberculosis nibbles."	Extrinsic: early, a dusky red, uniform swelling; later, ulceration.	"Syphilis bites."
Perichondritis common in advanced cases.		Perichondritis common.
Evolution slow.		Evolution rapid.

3. Local discomfort referred to the general area of the larynx. This may be described as a rawness or dryness or sense of foreign body.

4. Dysphagia.

Unilateral paralysis of a vocal cord may exist with scarcely any impairment of voice and usually indicates some serious affection in an adjoining structure.

The most serious disease of adult life is cancer, the early recognition of which can result in a high percentage of cures with minimal surgical risk and a useful voice if a suitable case for laryngo-fissure. Total laryngectomy offers a cure in a high percentage of cases in which the growth is localized to the interior of the larynx, with a small surgical risk, but depends on artificial aids for voice production.

PROPHYLAXIS OF POSTOPERATIVE PULMONARY ATELECTASIS*

WITH ESPECIAL REFERENCE TO THE USE OF CARBON DIOXIDE HYPERVENTILATION

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HISTORICAL SKETCH

IT is only during recent years that acute postoperative pulmonary atelectasis has commanded the attention of the surgical profession as an important potential complication in surgical procedures.

A collapsed condition of the lung independent of operative procedures, however, has been known for more than a hundred years. The atelectatic condition of the lungs was first described by Schenk[83] in 1811, who observed it in children dying shortly after birth. In 1826 Laennec,[19] in

*From the Department of Surgery, University of Minnesota. Presented by invitation before the Minneapolis Surgical Society May 5, 1932, being the prize winning essay of the Minneapolis Surgical Society for 1932.

reporting the findings of post-mortem examination of a case from the practice of Andral, described a similar condition in adults. He interpreted this as a manifestation of asthma. Louis,[14] in 1829, again described this lesion in adults.

The name atelectasis was coined by Jorg[83] in 1833 from two Greek words meaning "imperfect expansion."

In 1844 Legendre and Bailly[48] more clearly separated atelectasis from inflammatory consolidations. They hypothesized that its etiology was "partly the imperfect respiratory movements and partly the obstruction of the bronchi with secretions."

In 1845 Mendelssohn[14] showed experimentally that occlusion of the bronchi by foreign objects resulted in atelectasis. This work followed the observation made by earlier investigators that collapse sometimes eventuated when there was occlusion of bronchi from pressure exerted by tumors, lymph nodes, or aneurysm. Fuchs,[14] in 1849, was the first to suggest that the air distal to the obstructing plug was absorbed into the blood stream.

Williams,[82] in 1839, described a condition in which there occurred an effusion into the air passages, together with changes in the bronchial wall. This produced "the effect of rendering the lungs less easily expansible," but probably was not atelectasis. Mucous secretion in the bronchi actually corresponding to the collapsed portions of lungs was first definitely demonstrated by Bartels[21] in a series of autopsies reported in 1861.

Lichtheim[49] in 1878-1879 performed a classical series of experiments on rabbits to study the factors acting in collapse of the lung. He obstructed the bronchi without opening the thorax, and found that collapse occurred distal to the obstructing plug. If the pulmonary vessels were ligated, however, the same collapse did not result. This supported the theory of absorption into the blood stream advanced by Fuchs thirty years previously. The rate of absorption of the different gases was also studied and it was found that in rabbits oxygen was absorbed in forty-five minutes, carbon dioxide in from ten to thirty minutes and nitrogen in about twenty-four hours. He also found that collapse did not follow section of the phrenic nerve or section of the spinal cord at the second or third cervical segments. Van Allen and Adams[77] have questioned the validity of Lichtheim's work because sterile technic was not employed in operating, and they suggest that compression of the lung by empyema and pneumothorax may have interfered with the results. Experiments of a similar nature, however, have been recently performed by Coryllos and Birnbaum[21] with a very much refined technic. Their results substantiate the experiments of Lichtheim and seem, therefore, to nullify the objections of Van Allen and Adams.

The modern conception of massive atelectasis dates from the work of W. Pasteur,[59] who, in a series of papers beginning in 1890, established this condition as a clinical entity and aroused the interest of the medical profession in it. It was he who first applied the name "massive collapse" to the lesion. He was the first to suggest the possibility that some of the postoperative pulmonary complications might be atelectatic in nature. Such a case was first recognized clinically by Barr[5] in 1907, but the credit for establishing collapse as a rather frequent postoperative complication belongs to Pasteur.[61]

In 1914 Elliott and Dingley[26] reported eleven cases of postoperative atelectasis and emphasized the importance of obstruction of the bronchi by a viscid mucopurulent material as an etiological factor.

During the war, Bradford[8] found that atelectasis was a frequent complication of gunshot wounds, especially of those involving the chest, where it occurred in non-penetrating as well as penetrating wounds. He also observed that he did not find any case of pulmonary collapse in injuries of the head or upper extremities.

Scrimger,[72] in 1921, submitted the first article on postoperative pulmonary collapse to appear in the American literature. He classified five hundred forty operations among which the condition was observed in seven cases. Hirschboeck[44, 45] (1922 and 1924) was the first from this section, and among the earliest American writers, to discuss this condition. From this time on, numerous contributions have been made by different investigators.

ETIOLOGY OF ATELECTASIS

The etiology of atelectasis has not been definitely established, but the generally accepted opinion[15] is that the determining factor in most cases is bronchial obstruction, brought about by the presence of plugs of thick, tenacious mucus.

Other factors may act as contributing causes in bringing about this condition, and are classified as preoperative, operative, and postoperative. Among the preoperative factors we must consider the following:

1. Length of time in the hospital previous to operation.[14] In patients who had been hospitalized for two weeks or more prior to operation, Schaack[66] found that the incidence of postoperative pulmonary complications was four times greater than in those operated upon promptly after admission.

2. Pre-existing pulmonary disease, tending to increase the danger[14] by adding to the amount of bronchial secretions, or by decreasing vital capacity. The presence of bronchitis, bronchiectasis, and similar conditions in which there is increased bronchial secretion definitely increases the risk of postoperative atelectasis.

3. Preoperative medications:
   (a) Morphine, diminishing or abolishing the cough reflex, and depressing respiration.[52]
   (b) Atropine, tending to decrease the amount of bronchial secretions, making them more tenacious,[52] and tending to shift the intrapleural pressure toward the positive side.[10]
   (c) Epinephrine, also tending to increase the intrapleural pressure.[10]

The operative factors to be considered are:

1. Anesthetic. The choice of anesthetic apparently plays no important part, the incidence being approximately the same when the operation is performed under local, spinal, or general anesthesia.[14]

2. The position of the patient on the operating table.[71] Any position which allows gravitation of secretions to one side, or which diminishes the flow of tidal air, increases the risk. The time element does not appear to be a predisposing factor.[14]

3. Region and type of operation.[15] Atelectasis is most frequent following abdominal operations, while it rarely complicates intracranial procedures.

Some of the postoperative factors are:

1. Shallow respiration. This is the most important of all the contributing factors and is almost invariably present before collapse occurs. Band and Hall[9] found that limitation of the respiratory movements was essential in the experimental production of massive collapse. They state that three factors acting in combination must be present before collapse occurs: (1) the presence of a viscid intrabronchial secretion; (2) abolition of the cough reflex; and (3) limitation of respiratory movement. This conclusion was reached after carrying out a series of careful experiments upon dogs. They found that collapse did not occur unless the respiration was embarrassed in some manner. In postoperative cases this shallow respiration may be the result of pain,[21] or, as suggested by Carlson,[16] it may be a reflex inhibition independent of pain sensation. It is very likely that both of these play a part. Flatulent distension of abdominal viscera[57] may also embarrass the respiratory movements by causing an elevation of the diaphragm. Less commonly debility or toxic states may be the cause of shallow respiration. Since this factor of decreased respiratory movement is recognized as being of such great importance, any program of prophylaxis must aim to counteract it.

2. Position.[15] Those positions which tend to diminish the flow of tidal air predispose to atelectasis. The effect of posture on intrabronchial secretions must also be considered.

3. Medications:[14]
   (a) Morphine
   (b) Atropine
   (c) Epinephrine
   (d) Potassium iodide and ammonium chloride, which tend to liquefy tenacious secretions.[52]

Several other theories as to the etiology of atelectasis have been advanced, only one of which, however, has any considerable support at the present time. This is the theory that a reflex spasm of the bronchi, or some vasomotor disturbance, causes obstruction in the respiratory passages. Scott and his co-workers, Scrimger, and a few others believe that this, rather than obstruction by mucus, is the determining factor in postoperative collapse.

INCIDENCE OF POSTOPERATIVE ATELECTASIS

Reports of the incidence of postoperative atelectasis show great variation, some investigators having limited their classification to massive collapse while others have included the lesser degrees of atelectasis and hypoventilation. Pasteur[61] reported massive collapse in 0.8 per cent

of postoperative cases; Scrimger[73] in 1.3 per cent. Yandell Henderson[38] states that atelectasis occurs in a variable degree in 10 to 20 per cent, while Muller, Overholt, and Pendergrass[55] have demonstrated by a series of skiagraphs that a certain amount of hypoventilation occurs after nearly all operations of some types. Mastics, Spitler, and McNamee[51] state that atelectasis comprises about 70 per cent of all postoperative pulmonary complications.

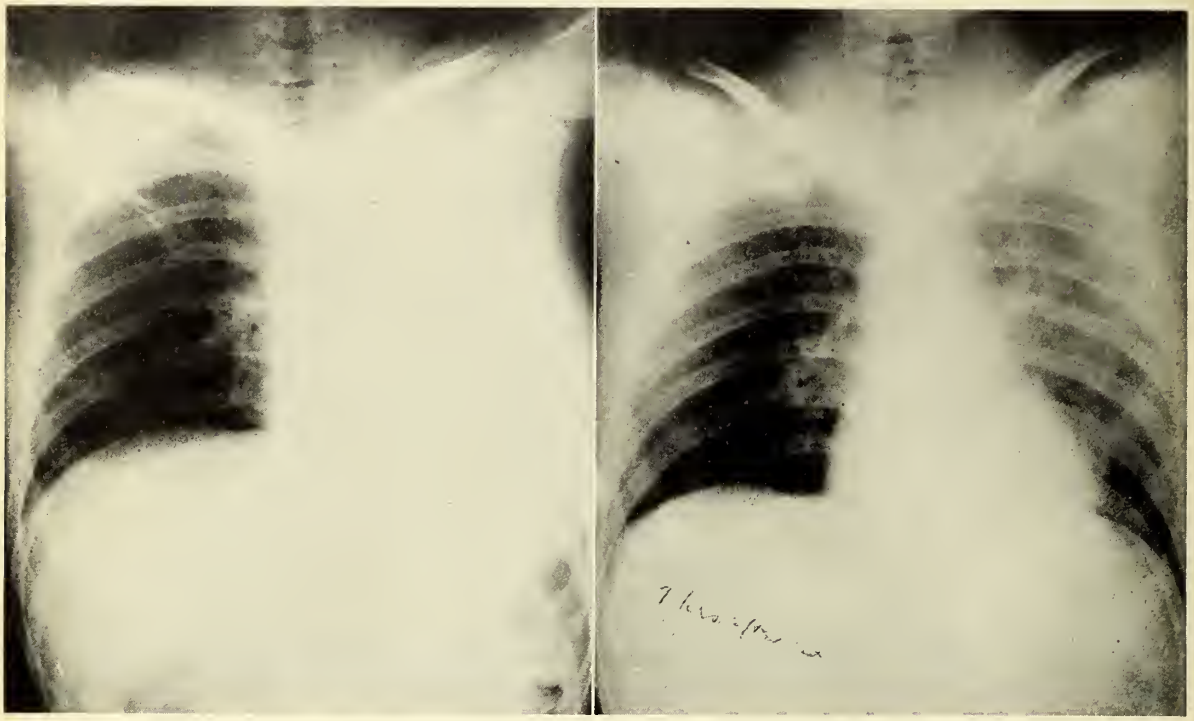


Fig. 1. A. *(left)* Roentgenogram of Case 1, showing massive collapse of the left lung. B. *(right)* Roentgenogram of Case 1, made seven hours later than the first film and showing marked resolution of the atelectatic process.

Abrams[1] has pointed out that there is a certain degree of "physiological atelectasis" present in normal individuals because all areas of the lung are not distended during ordinary breathing. There are small limited areas of the lung which are not open during quiet respiration, but which are readily opened when a few deep breaths are taken, only to collapse again when tranquil breathing is resumed. This physiological condition described as occurring in all normal individuals is, of course, quite distinct from the pathological condition of postoperative collapse, in which there is a bronchhial obstruction. It is mentioned in order to point out and emphasize the fact that deep breathing is nature's method of reopening atelectatic areas.

SYMPTOMATOLOGY

Scott[68] found that the onset of atelectasis occurred within twenty-four hours of the operation in 50 per cent of the cases and within forty-eight hours in 80 per cent. The symptoms in a well marked case are characteristic.[68] There is a sudden elevation of temperature and an increased pulse and respiratory rate, associated with dyspnea. In some cases there may be a hacking cough, and there may be pleuritic pain. The patient usually lies on the affected side or sits up in bed to facilitate breathing. Later, when the atelectasis begins to resolve, there is expectoration of a muco-purulent material which may be blood tinged. The expectoration may be present from the onset, but this is not common.

The condition may be recognized and a presumptive diagnosis of atelectasis made merely by observing the hospital chart. It is a clinical maxim that any condition in which there is a rise of temperature to 100.5-105 F., increased pulse rate to 100-120, and a respiratory rate between

twenty-five and forty, which appears within the first forty-eight hours after an abdominal operation is assumed to be atelectasis until it is proven otherwise.

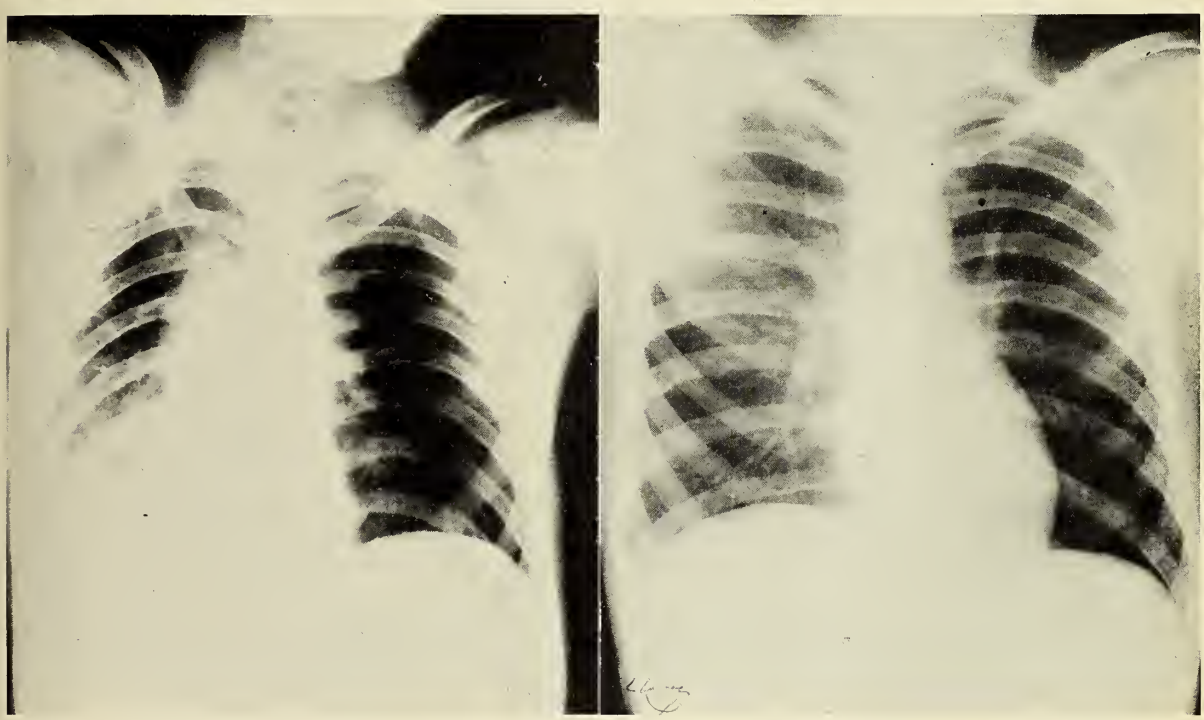


Fig. 2. A. *(left)* Roentgenogram of Case 2, showing massive atelectasis of the right lung. B. *(right)* Roentgenogram of Case 2, made forty-eight hours later than the previous film and showing almost complete resolution of the atelectasis.

Inspection shows limited excursion or immobilization of the affected side, narrowing of the interspaces, and, in a certain number, a peculiar brick-red flush of the face.

On percussion there is dulness over the affected area, displacement of the heart, mediastinum, and trachea toward the atelectatic side, and hyperresonance over the unaffected side.

Scott[68] reports that the breath sounds are altered: in some cases diminished or absent; in others, increased. Most cases, however, show the diminution of breath sounds. Râles are usually present at some stage of the condition, but appear rather late in most instances.

Radiographic examination[65] corroborates clinical findings. There is an increased density of the involved lung with a compensatory hyperaeration of the normal side. There is a marked elevation of the diaphragm on the side of the atelectasis, a displacement of the heart, mediastinum, and trachea toward that side, and a sinking in of the thoracic wall with a consequent increase of the obliquity of the ribs and a narrowing of the interspaces. This picture may be modified by fixation of the structures by previous infection.

Two typical cases of postoperative massive collapse are presented to elucidate the clinical and roentgenological findings:

CASE REPORTS

Case 1.—W. N. A., male, aged twenty-four, on the second day following a herniotomy under spinal anesthesia developed a hacking cough and complained of shortness of breath and pain in the chest. His temperature rose to 102° F. and his pulse to 124 per minute. The thoracic excursion on the left was greatly diminished, there was dulness to percussion on that side, and the heart was distinctly displaced to the left. Breath sounds were definitely diminished over the affected area. A roentgenogram was made, and a reproduction of the film is shown in Figure 1A. This shows massive atelectasis of the left lung. There is a dense shadow involving the whole left chest; displacement of the heart, mediastinum, and trachea to the left; elevation of the left diaphragm; and a sinking-

in of the thoracic wall with a consequent narrowing of the interspaces and an increased obliquity of the ribs. This may be contrasted with a second film (Figure 1B), taken seven hours later, which shows a marked resolution of the process.

Case 2.—L. M., male, aged eighteen, approximately forty-eight hours following an appendectomy under spinal anesthesia developed a cough and became dyspneic. His temperature rose to 103° F. and his pulse to 126 per minute. There was a peculiar brick-red flush of the face. The excursion of the right side of the chest was diminished, and the breath sounds were suppressed on that side. There was a marked displacement of the heart and mediastinum to the right. Figure 2A is a reproduction of the roentgenogram of this case, showing a massive collapse of the right lung. There is a marked displacement of the heart and mediastinum toward the right side, extreme elevation of the diaphragm, and a sinking-in of the chest wall. This film shows clearly the increased obliquity of the ribs and the narrowing of the interspaces. Almost complete resolution of the atelectatic process is shown in a film taken forty-eight hours later (Figure 2B).

Both of these patients were treated with carbon dioxide hyperventilation in conjunction with postural treatment.

Postoperative massive atelectasis must be differentiated from several other pulmonary conditions.

1. Pneumonia usually follows an injury or operation later than an atelectasis, and, unless there is an associated pulmonary collapse, there is no displacement of the heart and mediastinum. Râles are heard early in pneumonia, but appear late in most cases of atelectasis. The suppression of breath sounds found in nearly all cases of atelectasis also aids in differentiating these cases from pneumonia.

2. In cases with fluid in the pleural cavity (for example, effusion as a result of operative work on or near the diaphragm) the breath sounds are diminished or absent just as they are in atelectasis, but the differentiation is readily made by use of the X-ray, which shows either no displacement of the mediastinum or a displacement away from the involved side. The diaphragm, instead of being elevated, is displaced downward.

3. Pulmonary infarct, like pneumonia, appears later than atelectasis. The onset is painful and hemoptysis is an early symptom. The X-ray shows triangular or rounded densities somewhat similar to those observed in bronchopneumonia. There is no displacement of the heart and mediastinum.

4. Pneumothorax (spontaneous or accidental): In pneumothorax there is a tympanitic percussion note, while over an atelectatic area there is dullness. The X-ray picture of pneumothorax also aids in the differentiation.

MORTALITY

The mortality[14] of uncomplicated pulmonary atelectasis is low, except in the rare cases of bilateral massive collapse. When complicated by superimposed infection, however, the condition becomes very serious and results in many postoperative fatalities. Recent work by Coryllos and Birnbaum[22] indicates that pneumonia is a frequent sequel; in fact, these investigators believe that every pneumonia is preceded by a state of apneumatosis. Brunn and Brill[14] report that pulmonary abscess may also complicate collapse. Mathes, Holman, and Reichert[53] found that in experimental atelectasis produced in dogs by the introduction of small sea-sponges into the bronchi, death invariably followed by secondary infection unless the plug was displaced. Consequently prophylaxis is of great importance in decreasing the number of postoperative deaths.

PROPHYLAXIS

Postoperative hyperventilation of the lungs as a prophylactic measure against atelectasis has recently commanded widespread attention. For this purpose mixtures of oxygen with five or ten per cent of carbon dioxide are used. This practice dates from 1928, when Scott and Cutler[70] reported that in reviewing their operative cases they found a smaller incidence of atelectasis among those cases which had been hyperventilated postoperatively (to hasten the elimination of the anesthetic, as suggested by Henderson, Haggard, and Coburn[41]) than among patients not so hyperventilated. Consequently, they recommended that carbon dioxide inhalations be given following operation, regardless of the type of anesthesia, in order to diminish the risk of collapse. This procedure has been widely accepted and many workers, including Brown,[12] Brunn and Brill,[14] Overholt,[57] Mathes and Holman,[52] Burcham and Dahl,[15] Dyke and Sosman,[24] Moore,[54] O'Brien,[56] Henderson, Coryllos, and Birnbaum,[40] and many others report favorable results.

The administration of carbon dioxide-oxygen mixtures is usually combined with postural treat-

ment. Sante,[64] Scott and Joelson,[71] Mathes and Holman,[52] and many others emphasize the importance of frequent changes of position during the first few days following the operation. Scott and Cutler,[70] and Mathes and Holman[52] recommend that the patient be placed in the semi-Fowler position postoperatively because Christie and Beams[17] found that there was a reduction of vital capacity in most individuals lying in the supine position. Overholt,[57] on the other hand, states that the difference in the vital capacity is so slight as to be insignificant and believes that the patient should be maintained in the most comfortable position. Boland and Sheret[6] advocate elevating the foot of the bed twenty inches above the head for twenty-four hours after operation in order to get postural drainage. They report that although a headache sometimes results from maintenance of this position the incidence of atelectasis is diminished. Overholt,[57] and Brunn and Brill[14] advise putting the patient in the Trendelenburg position for short periods of time when the secretions are copious. Faulkner and Faulkner[29] also recommend the Trendelenburg position following operation because this prevents spillage and aspiration into the bronchi. They emphasize the importance of postural considerations both in prevention and treatment of atelectasis.

Jackson and Lee[47] have warned against the use of morphine because of its depressant effect on the cough reflex. Band and Hall in a recent paper[9] have advocated the use of nembutal rather than morphine preoperatively, because it calms and quiets the patient without acting as a depressant. Bowen,[7] Boland and Sheret,[6] Dyke and Sosman,[24] Burcham and Dahl,[15] Scheffey, Jones, and Clerf,[67] and others concur in the opinion that the use of morphine should be avoided as far as possible, both preoperatively and postoperatively. Scrimger,[73] however, recommends the use of morphine postoperatively for its quieting effect, and Overholt[57] states that the relief of pain which it offers results in an increase of vital capacity, which, in his opinion, is more important than the preservation of the cough reflex. Van Allen and Lindskog[79, 80] in recent articles have pointed out that in order for the cough to carry an obstructive plug toward the larynx, the pressure distal to the plug must be greater than the proximal pressure. In other words, the cough depends for its effectiveness upon the presence of "available air" distal to the plug. In the absence of this "available air," they maintain, the cough is not effective and may even do harm by causing a more rapid absorption of the residual air imprisoned distal to the obstruction. They advise, therefore, that coughing be allowed only in moderation, and that an excessive amount be controlled by narcotics. Coryllos and Birnbaum[23] disagree with them on this issue, insisting that the cough reflex is the most valuable of the natural defense mechanisms[50] of the lungs, and arguing that the absorption of the imprisoned gases could not be hastened by coughing. Even though the obstructing plug be not expelled by the cough, there is no need to fear that it will be driven farther into the bronchial tree, for Archibald and Brown[2] have shown that, while a fluid substance such as lipiodol or an emulsion of lipiodol and sputum may be driven deeper into the pulmonary tree, this never occurs with thick, tenacious sputum. It would seem that the wisest policy is to control pain, because pain leads to shallow respiration and this increases the danger of atelectasis. The cough reflex, however, should be retained if possible, because it is an important protective mechanism and its absence contributes to the risk of atelectasis. If pain can be controlled with drugs which depress the cough reflex less than morphine it is best to use these drugs; otherwise morphine must be used.

Elliott and Dingley,[26] and Scheffey, Jones, and Clerf[67] advise against restriction of respiratory movements by tight dressings. Overholt,[57] however, found that the ordinary surgical dressings consisting of gauze and adhesive tape produced very little change in the vital capacity. Tightly fitting binders, on the other hand, do affect the vital capacity appreciably and should be avoided.[57] In the present study, pneumographic tracings were made on patients with dressings and binders in place, and again after dressings and binders had been removed. The results indicate that ordinary surgical dressings and loosely fitting binders do not interfere with the respiratory movements.

Voluntary increase in the depth of respiration and voluntary coughing have been recommended.[52] The presence of pain, however, makes this difficult or impossible of execution and is, according to Graham, of little value.[56]

In the opinion of Mathes and Holman,[52] it may also be advisable to eliminate the preoperative

administration of atropine, especially in those cases where there is evidence of bronchitis. The atropine, while decreasing the amount of bronchial secretions, makes them more tenacious and thus increases the danger of bronchial occlusion. Prinzmetal, Brill, and Leake[63] have demonstrated that atropine produces an increase in the intrapleural pressure, and this effect, which is prolonged, would tend to favor atelectasis.

Brill and Leake[10] have also shown that epinephrine shifts the intrapleural pressure toward the positive side. This effect is likewise prolonged and does not become evident until after the effect on the blood pressure has almost disappeared.

Elliott and Dingley[26] recommend the use of expectorants to liquefy and loosen the tenacious mucopurulent sputum which they observed. Brunn and Brill[14] used potassium iodide and steam inhalations in a few of their cases, and Mathes and Holman[52] found that ammonium chloride and potassium iodide were effective in reducing the accumulation of tenacious sputum.

HISTORY OF THE THERAPEUTIC USE OF CARBON DIOXIDE

Hyperventilation induced by carbon dioxide inhalation was first used therapeutically to hasten the elimination of anesthetics immediately after operation. It was introduced by Henderson, Haggard, and Coburn[41] in 1920, and later also advocated by White.[81] Since that time it has been accepted and used almost universally for that purpose.

In 1922, Henderson and Haggard[39] suggested that inhalations of carbon dioxide and oxygen be employed to hasten elimination of the poison in cases of carbon monoxide poisoning, and they devised an inhalator to facilitate this treatment.

In 1928 Henderson[36] recommended that a mixture of 5 to 6 per cent of carbon dioxide in oxygen be used in the resuscitation of the newborn.

It was also in 1928 that Scott and Cutler[70] advocated the therapeutic use of carbon dioxide hyperventilation for the prophylaxis against postoperative pulmonary atelectasis. Since that time it has been widely employed, and many investigators have reported that it has resulted in marked decrease in the incidence not only of atelectasis, but also of postoperative pneumonia.

PHYSIOLOGICAL CONSIDERATIONS

Physiologists have shown that the amplitude and rhythm of the respiratory movements are controlled through the respiratory center. This center is regulated by afferent nervous impulses reaching it chiefly by way of the vagi, and more especially by the carbon dioxide concentration in the blood. Haldane and Priestley[34] in 1905 showed that the oxygen concentration does not affect the respiratory center until the pressure of the oxygen in the inspired air falls below twelve or thirteen per cent of an atmosphere. Apnea does not result from hyperoxygenation but does result from carbon dioxide deficiency. The carbon dioxide is the important factor in activation of the respiratory center, which is sensitive in a high degree even to slight changes in the concentration. Haldane and Priestley[34] found that a rise of 0.2 per cent of an atmosphere in the alveolar carbon dioxide pressure caused a doubling of the ventilation of the lung alveoli.

Inhalation of a mixture of 5 to 10 per cent of carbon dioxide in oxygen as used for therapeutic purposes obviously greatly increases the partial pressure of the carbon dioxide in the gaseous mixture in the alveoli. Consequently, in accordance with the law of Henry, which states that the mass of gas which a liquid will absorb is directly proportional to the partial pressure of that gas, the concentration of carbon dioxide in the blood stream is greatly increased. Therefore, hyperpnea results from the increased stimulation of the respiratory center.

METHODS EMPLOYED IN THE PRESENT STUDY

During 1931, in the surgical wards of the University Hospital, a series of fifty pneumographic tracings were made on fifteen different patients, using the method of Greisheimer[31] as modified by Carlson[16] (described below), to observe the effects of carbon dioxide hyperventilation upon the respiratory movements. Among this series were four cholecystectomies, two herniotomies, three thyroidectomies, four appendectomies, one postoperative fecal fistula, and one desmoid tumor. Both preoperative and postoperative tracings were included in the study. The principal object of this work was to determine whether carbon dioxide exerted any prolonged effect upon respiration, or whether the effect was entirely transient.

Two rubber bags were taken from sphygmomanometers and placed in covers long enough to

be used around the thorax and abdomen of the patient. The bulbs for inflation of the bags were left in place, and by means of the other tubes the bags were connected to water manometers.

TABLE I. TABULATION OF THE CHANGES IN RATE AND AMPLITUDE OF RESPIRATION DURING INHALATION OF 10 PER CENT CARBON DIOXIDE AND 90 PER CENT OXYGEN

Type of Case	No.	Percentage of Increase in the Respiratory Rate			Percentage of Increase In the Amplitude of the Respiratory Excursion					
					Thoracic			Abdominal		
		Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.
Cholecystectomy	4	31	5	9.2	255	44	125.4	200	45	107.7
Appendectomy	4	38	5	15.7	200	20	101.9	400	72	192.4
Thyroidectomy	3	25	4	10.5	125	22	65.0	150	34	64.7
Herniotomy	2	22	4	9.1	117	50	90.2	257	60	136.8
Faecal Fistula	1	110	25	63.4	300	67	172.3	800	300	466.7
Desmoid Tumor	1	29	5	16.0	100	13	75.0	200	50	115.5
Total	15	(Including fifty pneumographic tracings)								

Each water manometer was fitted with a cork float which supported a thin glass rod bearing a celluloid pointer, and the excursions of the pointer were recorded on the smoked drum of a Harvard kymograph.

The bands were placed snugly around the chest and abdomen of the patient, and the rubber bags were inflated to such a pressure that the pointers were two centimeters above the base lines. The excursions of the pointers then represented the change in pressure within the rubber bags caused by the respiratory movements, and they were recorded synchronously, one above the other, on the slowly moving smoked drum. The respirations were counted directly and recorded. All tracings were taken with the patient in the supine position and with arms at the sides.

The abdominal and thoracic respiratory movements were recorded for a period of three minutes. Then a mixture of 10 per cent carbon dioxide and ninety per cent oxygen was administered for three minutes. The tracing was then continued for another three to five minutes. Again after intervals of fifteen minutes, thirty minutes, and even as late as two hours after the administration of carbon dioxide, further tracings were made in some cases.

RESULTS OF THIS INVESTIGATION

The changes in the respiratory movements as observed were:

1. An increase in rate of respiration. This increase was the result of a shortening of both the inspiratory and expiratory phases.

2. An increase in the amplitude of excursions, both thoracic and abdominal, which was immediate upon the administration of the carbon dioxide and reached its maximum after forty-five to ninety seconds. This level was maintained during the inhalation of the gas. When the administration of gas was discontinued the amplitude of respiration decreased rather rapidly over a period of sixty to ninety seconds and then after two or three minutes of irregularity returned to the original level. The tracings taken at later intervals showed no deviation from the type of respiration observed before the administration of the carbon dioxide.

3. In fourteen of the fifteen cases studied, the chest was maintained in a state of greater expansion during the period of administration of gas.

4. In every case observed the effects of the carbon dioxide were transitory. There was never any prolonged or permanent alteration in the character of respiration.

A measure of the action of hyperventilation on the rate and amplitude of respiration is given in Table I. The effects of the carbon dioxide may be observed directly in Figures 4 and 5, which are facsimiles of typical tracings. The position of greater inspiration of the chest, which is maintained during administration of the hyperventilating mixture, is made more obvious in Figure 4 by the line drawn along the base of the thoracic tracing.

COMMENT

The increased ventilation resulting from the accelerated rate and the greater depth of respiration tends to keep the lungs distended and thus aids inflation of the lungs. These effects, however, as demonstrated in this series of experiments, are all transitory and disappear shortly after the administration of the carbon dioxide is

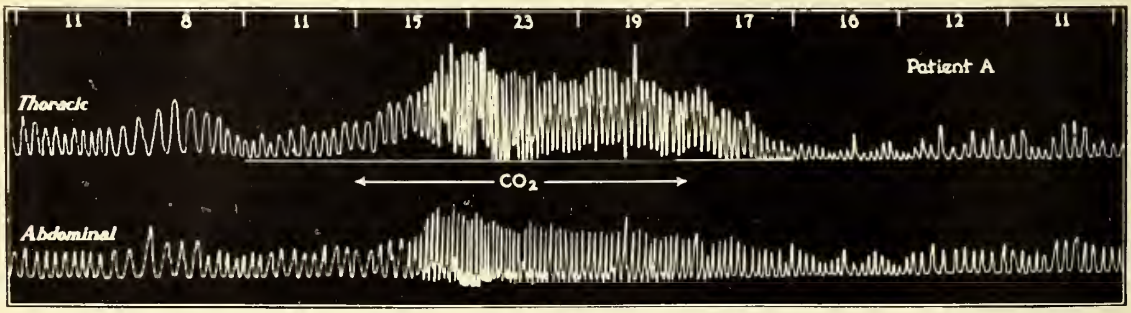


Fig. 3. Typical pneumographic tracing. The figures at the top of the tracing denote the rate of respiration. The period of administration of carbon dioxide is represented by the arrows. The position of greater inspiration of the chest is emphasized by the line drawn along the base of the thoracic tracing.

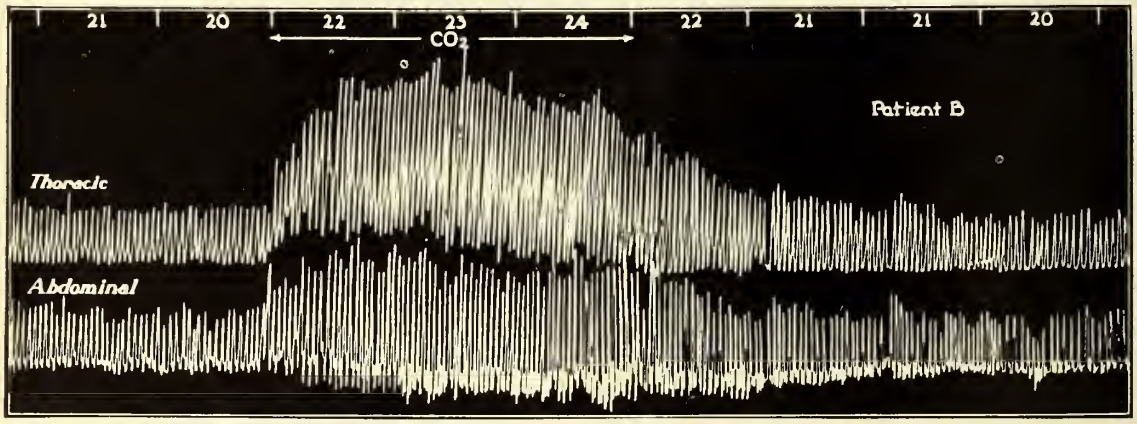


Fig. 4. Typical pneumographic tracing, illustrating the increase in rate, the greater amplitude, and the position of greater inspiration of the chest during administration of carbon dioxide. The rapid return of the respiration to the original state, after discontinuation of the hyperventilation, is clearly shown.

prevent atelectasis.[37] Brown,[12] and Brunn and Brill[14] have observed directly, by means of bronchoscopic examination, the action of carbon dioxide on the tracheo-bronchial tree. They noted that the hyperventilating gas mixture produced violent movements of the bronchi, thereby tending to free adherent mucus. As noted above, the acapnial position[38] of the thorax is also overcome during the administration of the gas, the chest being maintained in a state of greater expansion. Prinzmetal, Brill, and Leake[63] in 1931 observed this phenomenon in dogs and found that it was accompanied by development of a more negative intrapleural pressure. It is reasonable to suppose that a similar alteration of intrapleural pressure occurs in humans, and if that be true it probably discontinued. This is explained by the fact that the hyperpnea promptly eliminates the excess carbon dioxide from the blood stream, removing the chemical stimulus which has incited the respiratory center to hyperactivity.

Since it has been shown that the success of hyperventilation depends entirely upon a transitory effect, it would seem advisable to administer the carbon dioxide at frequent intervals in order that the maximum benefit might be derived.

The question then arises as to which cases require routine postoperative hyperventilation. Mathes and Holman[52] have recommended postoperative administration of carbon dioxide to all cases except infants, individuals with pulmonary

disease, and cachectic patients. In the light of the recent work of Carlson[16] at the Minnesota University Hospital, however, it would appear that such an extensive program of hyperventilation is not necessary. This work, based upon a study of seventy-six patients, indicates that respiration is markedly affected only after abdominal operations (especially upper abdominal), and that there is little or no inhibition of abdominal breathing after procedures such as phrenic exeresis and operations upon the thorax, perineum, or extremities. After thyroidectomy there is a slight inhibition of abdominal respiration but the return to the preoperative level is rapid. The amplitude of thoracic excursions and the rate of respiration are increased after most operations (including abdominal operations). Carlson[16] believes that the pulmonary hypoventilation resulting from the inhibition of abdominal respiration following abdominal operations is an important contributing factor in the production of atelectasis. It is a clinical fact that most cases of atelectasis do follow abdominal operations.[48] Routine hyperventilation, therefore, is indicated following abdominal procedures; and it should be remembered that this includes those cases operated upon under spinal or local as well as under general anesthesia. Hyperventilation is also indicated in those cases where there is abundant bronchial secretion, regardless of the type or region of operation, for these patients are especially liable to develop atelectasis. Elderly and debilitated patients comprise a third group among whom pulmonary complications are common, and they should receive prophylactic hyperventilation postoperatively.

The success of this procedure depends entirely upon transient effects; the hyperpnea opening up collapsed areas in the lungs just as deep breathing opens up areas of "physiological atelectasis," and violent movement of the tracheo-bronchial tree tending to loosen adherent mucus. Consequently, it must be used at frequent intervals. In most cases it is sufficient to hyperventilate the patient three or four times a day. In some instances, however, the carbon dioxide should be administered more frequently. For example, patients who have a great deal of pain from the incision will breathe less deeply than those who experience less pain. The degree of hypoventilation is, therefore, greater, and more frequent administration of carbon dioxide is indicated in order to keep the lungs inflated. Patients with a bronchorrhea also require more frequent hyperventilation, for in such cases there is obviously greater danger of obstruction of the bronchi and, consequently, greater risk of atelectasis. Debilitated patients, likewise, should be hyperventilated at more frequent intervals because their respiration is usually shallow and they are very susceptible to pulmonary complications. In some cases it may be advisable to administer the hyperventilating mixture as often as every two or three hours, day and night. The surgeon, in arriving at his decision as to the frequency of these administrations in each case, should take into consideration the amount and type of intrabronchial secretions and the character of the patient's respiration, and he must bear in mind the fact that the effects of the hyperventilation are transitory. Usually it is not necessary to continue the hyperventilation after the second or third postoperative day, but in judging this also, the amount of secretions and the character of the respiration must be considered, and in unfavorable cases the procedure should be continued throughout the convalescence.

At the University Hospital a mixture of 10 per cent carbon dioxide and 90 per cent oxygen is used for purposes of hyperventilation, and proves very satisfactory. This mixture may best be given for a period of approximately three minutes. It is not necessary to extend the time of administration beyond this, and continued hyperpnea serves only to tire the patient.

A review of the records of the University Hospital shows that, in spite of the program of routine hyperventilation which is carried out, cases of massive collapse do occasionally occur. Since January, 1930, eight such cases have been observed. Six of these were unilateral and two were bilateral. They are briefly summarized in Table II.

These cases, with the exception of patients H. P. and L. B., all received the prophylactic administration of the carbon dioxide and oxygen mixture. Positive protection, therefore, is not obtained, but this procedure markedly reduces the incidence of atelectasis.

TREATMENT OF ATELECTASIS

The treatment of a fully developed case of atelectasis is aimed at the reopening of the air

TABLE II. CASES OF MASSIVE COLLAPSE FROM THE RECORDS OF THE UNIVERSITY HOSPITAL (MINNEAPOLIS)

January 1930—June 1932

Case	Age	Sex	Type of Operation	Anaesthesia	Side of Atelectasis	Outcome
W. N. A.	23	M	Repair of inguinal hernia (left)	Spinal	Left	Atelectasis cleared up rapidly under treatment.
L. M.	18	M	Appendectomy	Spinal	Right	Atelectasis cleared up rapidly under treatment.
H. S.	55	M	Repair of recurrent inguinal hernia (left)	Spinal	Left	Atelectasis resolved under treatment.
H. P.	63	F	Radical mastectomy (right) for Paget's disease	Gas-Ether	Left	Atelectasis resolved rapidly.
M. D.	28	F	Right oophorectomy	Spinal	Left	Atelectasis resolved under treatment, but the presence of an upper respiratory infection necessitated treatment over a period of six days.
H. D.	58	M	Anastomosis between ileum and colon for carcinoma of caecum	Spinal	Left	Lobar pneumonia later developed in the left lower lobe. The pneumonia became bilateral and patient expired.
E. M.	34	F	Bilateral salpingectomy	Ethylene-Ether	Bilateral	Patient died on the fifth postoperative day. Bilateral massive atelectasis demonstrated at necropsy.
L. B.	55	F	Operation for carcinoma of esophagus	Spinal supplemented by general	Bilateral	Lethal outcome on the third postoperative day. Bilateral massive collapse was demonstrated at necropsy.

passages and reinflation of the lungs. To attain this end, postural treatment is combined with carbon dioxide hyperventilation.[14] The postural treatment most widely accepted is that advocated by Sante[65] in which the patient lies on the unaffected side, is rolled back and forth and encouraged to cough. This procedure and hyperventilation usually suffice to reopen the bronchi and allow reinflation of the lung.[54] Singer[75] has recently developed a multiposition bed which greatly facilitates postural changes and probably can be used to advantage both in the treatment and prophylaxis of postoperative atelectasis. In event that these procedures are unsuccessful, bronchoscopic removal of the obstructing plug may be undertaken. Jackson and Lee,[47] Tucker,[76] Brown,[12] Brunn and Brill,[14] and others have reported cases which were successfully treated by bronchoscopy, but as pointed out by Mathes and Holman,[52] and Scheffey, Jones and Clerf,[67] this is a rather formidable procedure and should not be employed unless the simpler methods have failed.

Elkin,[25] Farris,[28] Habliston,[32] and Scrimger[73] have injected air into the pleural cavity on the affected side in order to relieve the cardiac embarrassment coincident with the mediastinal displacement. Bowen,[7] and Brunn and Brill,[14] condemn such treatment because it does not relieve the pulmonary condition, but actually favors the collapsed state of the lung.

SUMMARY AND CONCLUSIONS

1. Atelectasis, in some degree, is the most frequent of postoperative pulmonary complications, and merits the serious consideration of the surgical profession.

2. The most widely used prophylactic procedures are:

(a) Hyperventilation induced by administration of carbon dioxide; and

(b) Postural measures, including frequent changes of position to prevent the accumulation of secretions in dependent portions of the lung and, in cases which have copious secretion, postural drainage.

As adjuncts to these procedures, various other measures have been suggested. Among these are: the avoiding of tight binders which embarrass the respiratory movements, voluntary coughing, the administration of expectorants, and the elimination of the preoperative administration of atropine. There is disagreement as to whether or not morphine should be given, but most investigators believe that its use should be restricted to the extent that it does not interfere with the cough reflex. Pain, however, should be controlled.

3. Inhalation of carbon dioxide produces an increase in the rate and depth of respiration, and also causes the thorax to be maintained in a state of greater expansion. This distends the lung and tends to open areas of atelectasis. It also produces violent movement of the tracheo-bronchial tree, tending to dislodge adherent mucus and thus open the air passages.

4. The effects of carbon dioxide inhalation are transient and disappear when the administration of the gas is discontinued.

5. There are three principal groups of patients who require postoperative hyperventilation. These are:

(a) Those who undergo abdominal operations.

(b) Those who have excessive bronchial secretion.

(c) Elderly and debilitated patients.

6. Since the beneficial results of carbon dioxide inhalation are temporary, it is recommended that the hyperventilation be repeated at frequent intervals. In most cases three or four administrations a day are sufficient, but there is a considerable number of cases who require more frequent hyperventilation.

7. It is suggested that each administration be continued over a period of three minutes, using a mixture of 10 per cent carbon dioxide and 90 per cent oxygen.

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CORRELATION BETWEEN CLINICAL AND X-RAY FINDINGS IN TUBERCULOUS INDIVIDUALS*

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THE prompt identification of tuberculosis infection and the early recognition of related signs indicating breakdown are essential for both early recovery, familial and economic re-establishment, as well as for the prevention and control of tuberculosis.

During the past fifty years our attitude towards tuberculosis has passed through a negative and is now entering a positive phase. The infection is sought at its source. The control of the disease begins with the control of tubercle bacilli in the sputum of the clinical case, the end-result of a biological relationship between parasite and host that could terminate in no other way and permit the parasite to survive. Control measures whatever they may be must seek to limit exposure of susceptible contacts to positive sputum cases, identify promptly those infected, and initiate treatment early to prevent the escape of the bacilli from the infected host.

A study of cases admitted to the Minnesota State Sanatorium from January 1, 1928, to December 31, 1931, was made to determine if possible the further use of our knowledge of tuberculosis gained from incoming cases for purpose of control.

During the four years under consideration, 852 patients were admitted to the State Sanatorium; fifty-eight had been in the Sanatorium previously, thirty-six of whom were readmitted with positive sputum. Twenty of these patients returned suffering from reactivation and extension of old lesions. The remaining 794 cases were admitted in various stages. Not all were active; in fact, the family physician frequently had been called in after the infection had become quiescent.

According to our classification upon admission 202 were Stage I, 261 were Stage II, and 274 were Stage III cases. Of the remaining 115 cases, eighty-seven were juvenile in type and twenty-eight non-tuberculous.

Contact was found to explain the infection very frequently. Familial exposure accounted

*From the Minnesota State Sanatorium. Read before the annual meeting of the Minnesota State Medical Association, St. Paul, May 24, 1932.

for 321 cases, while twenty-one were exposed through marital contact and twenty-six through roommates. Nineteen nurses and five orderlies were exposed through caring for tuberculous patients. Two hundred and fifty-nine patients admitted during this period remained in the Sanatorium January 1, 1932. Of the 598 discharged, 100 had died, 124 had been discharged against medical advice, 274 as having received maximum sanatorium care and 100 had been transferred to other hospitals or sanatoria.

The sputum is an important item in any discussion of tuberculosis, since it transmits the infection. Among the cases now being considered 300 gave a history of no sputum on admission, while soon after admission the number diminished to 118. There were 382 who gave a record of having positive sputum before and 435 after admission. Negative sputum was reported in 170 cases, while 258 became negative after admission.

The distribution of pulmonary findings on physical examination shows unilateral disease in 311 (36 per cent), and bilateral disease in 316 (37 per cent) of the cases examined. The remaining 225 patients showed no physical signs on examination.

A study of onset of symptoms among 879 patients admitted to the Minnesota State Sanatorium since April, 1927, was made with the following results: One and hundred and ninety-one cases were acute in onset, twenty-two followed pneumonia, eighty-seven began with pleurisy and eighty-two with pulmonary hemorrhage. Two hundred and twenty-four gave indefinite histories of prodomal symptoms. The remaining 464 patients gave a definite history of a prodromal period leading up to clinical breakdown. The prodromal period as an important phase in the development of clinical tuberculosis has been frequently overlooked, due possibly to the fact that we have not yet fully evaluated the importance of the history of exposure, coordinated with the X-ray findings and the skin sensitization test. We now identify the prodromal period in retrospect, when with the means at hand we should be making our diagnosis and initiating treatment. With the development and use of diagnostic refinements now in our possession, the recognition of clinical tuberculosis promises to be made during the prodromal period, rather than following breakdown.

Fifty patients gave a prodromal history of less than one month prior to clinical breakdown, forty-three, one to two months; thirty-five, two to three months; sixty-five, four to six months; 227, six months to one year, and nine over one year.

In one hundred and fourteen influenza was associated as a contributing factor. Whether there is an actual coincidence between acute respiratory infections identified as influenzal in origin and the onset of tuberculosis remains a problem requiring further study. It appears from our observation that these so-called influenzal attacks are a part of the syndrome of early pre-clinical tuberculosis. The patients formerly have given a history of repeated colds, whereas now they describe the incident as being an influenza.

One hundred seventy-four of this group of patients were married women, 134 of whom gave a history of pregnancy. Nine were infected through marital exposure while forty-six were exposed to infection through blood relations before marriage. One hundred and twelve showed tubercle bacilli in their sputum. Tuberculosis developed five years or more after the last pregnancy in fifty-five cases while in seventy-nine cases it developed during the child-bearing period.

In forty-nine of the women developing tuberculosis during the child-bearing period, childbirth was given as a factor. Thirty women while suffering from clinical breakdown close to the period of confinement were unable to associate their tuberculosis with pregnancy. These mothers were equally divided between those up to and including thirty-four years of age, and those older. They have reported seventy and seventy-two childbirths respectively. In nine instances in the younger group pregnancy occurred over five years before the onset of symptoms, while forty-five among the older women reported their first symptoms five years or more following their last pregnancy. Among the younger women thirty-five definitely associated breakdown with childbirth, while this occurred fourteen times in the older group. Deaths occurred in thirty of these women, fifteen each in the groups of the older and younger women.

The X-ray examination of the group admitted during the period under consideration indicates that we have accepted another and finer screen for our identification of tuberculosis. According to X-ray examinations, 251 (29 per cent) showed

unilateral, and 501 (57 per cent) bilateral distribution of the infection. One hundred patients (12 per cent) representing the juvenile type of infection and still fewer the surgical cases were reported negative so far as parenchymal infiltration is concerned as interpreted by the X-ray.

and frequently bilateral. Sixteen mid-chest and basal lesions showed no evidence of recent or old infiltrations either apical or subclavicular.

While the X-ray has very materially extended our knowledge of the biology of tuberculosis it usually does not aid us in the large group of

COMPARISON OF FINDINGS ON PHYSICAL EXAMINATION AND X-RAY

	Physical Examination		X-ray Examination		Cavities on Physical		Cavities on X-ray		Physical and X-ray	
	Unilateral	Bilateral	Unilateral	Bilateral	Unilateral	Bilateral	Unilateral	Bilateral	Agree	Disagree
Juvenile	9	4	5	74					69	9
Stage I	91	23	103	31	1		5	2	74	125
Stage II	109	115	92	164	26	1	87	23	48	212
Stage III	95	171	48	228	31	11	114	84	49	221
Non-Tbc.	7	3	3	4					21	3
Total	311	316	251	501	58	12	206	109	261	570

Sixty-eight per cent of the group had positive findings on physical examination. Eighty-eight of the same group were reported with positive X-ray findings. The number of cases showing negative findings as a result of examination decreased as a result of X-ray from 276 to 100. Unilateral disease decreased from 301 on clinical examination to 251 on X-ray, while bilateral disease was demonstrated in 316 cases on examination and 501 by the use of the X-ray.

The presence of cavities among those X-rayed shows an even more marked variation between interpretation of the clinical and X-ray findings. Clinically, cavities were demonstrated unilaterally in fifty-eight cases (7 per cent) and bilaterally in 12 (1.5 per cent). The X-ray readings of plates taken of these patients show unilateral cavitation in 206 (24 per cent) and bilateral cavitation in 109 (12 per cent).

During the past few years much has appeared in the medical literature concerning the relative importance of apical and subclavicular infiltrations.

In our series of cases, 613 were reviewed in order to determine so far as possible the location of the original infection. Two hundred and forty-five showed subclavicular disease, 183 of whom showed evidence of extension, while 62 showed evidence of fibrosing lesions. One hundred and thirty-four apical lesions showed twenty-two with evidence of extension and 112 were fibrosing. Two hundred and eighteen could not be identified, since the lesion was massive

juvenile or first infection cases from whose ranks many are later to be chosen for parenchymal disease. The skin sensitization test is reaching out to all contacts in those families with members suffering from clinical breakdown, by its ability to screen closer than the eye, finer than the stethoscope and even more completely than the roentgenogram. To what purpose and for whose advantage? If it is to satisfy an idle curiosity it is not worth while. If it is to uncover an occasional clinical case a month or six weeks before breakdown it too would be too expensive a procedure to justify the effort.

However, if the infected members are to be put under the careful and constant observation of the family physician, and if this medical observation includes a strict discipline regarding health habits, protection against known predisposing factors, continuous exposure to tuberculosis or opportunities for reinfection through occasional contact, then the skin sensitization test will become the basis of our future diagnosis of tuberculosis. The infection will be recognized in its incipiency and controlled before pathological advance can endanger others. The eventual diagnosis of tuberculosis will not be by means of stethoscope or X-ray, valuable as they are, since neither possesses the fine discriminating power to identify the infected person before pathology develops, with the same precision and uniformity as shown in the skin sensitization test, which should become of increasing importance as the incidence of parenchymal disease diminishes.

The first step in the diagnosis of tuberculosis has always been, and must continue to be, the responsibility of the family physician. The patient sees the family physician when the diagnosis is most difficult, when proper advice is often objectionable, but the family physician must be depended upon for counsel and guidance. Upon the patient's return home from the sanatorium, the social and economic problem remains for the family physician. He must be schooled in the problem of tuberculosis control. He must be much more than a family clinician to be a family physician to the tuberculous. He, rather than the sanatorium or the specialist in tuberculosis, controls the machinery which makes the elimination of tuberculosis possible.

A TUBERCULOSIS SURVEY IN A PRIVATE HOSPITAL

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WITH the coöperation of the Board of Directors and Medical Staff, a tuberculosis survey was conducted at the Swedish Hospital in Minneapolis during January, 1932. The study included routine application of Mantoux tests followed by X-ray examinations of all positive tuberculin reactors. No fees were charged either for the test or for the X-ray film except in a few instances where the patients' symptoms justified this type of examination independent of the survey which was being carried on at that time. With respect to patients, employees and student nurses, the survey was very complete, but we failed to obtain equally complete observations on the medical and graduate nursing staffs.

At first the hospital administration feared that certain patients might object to tuberculin tests and X-ray examinations, but were pleasantly surprised to find that, by using tact, few or no objections were encountered, and also that the great majority of the patients appreciated receiving a thorough examination.

In order to avoid large reactions which might alarm the patients, only 0.05 mgm. of old tuberculin was introduced intracutaneously in performing the Mantoux tests. During the month 586 individuals were tested, of which 27.06 per cent (162 cases, Table I), had positive reaction. The percentage of positive reactors found among the patients was practically identical to the incidence noted for the student nurses (20.7 and 20.5 per cent respectively), which in each case was distinctly lower than the relative frequency of positive reactors found among the hospital employees (57.7 per cent). Why the incidence of tuberculous infection was so high relatively for this last group is uncertain although the possibility that contact with tuberculous patients in the hospital was partly responsible for this condition suggests itself.

TABLE I

	Number of Cases	Positive Mantoux Per Cent
Patients	353	20.7*
Employees	111	57.7
Nurses	122	20.5
Total and Average	586	27.6
	Student Nurses	
First Year Class	35	17.1
Second Year Class	42	19.0
Third Year Class	43	25.6

A further analysis of the tuberculin reactions for the student nurses (Table I) reveals a progressive increase in the percentage of positive reactors paralleling the length of service at the hospital. The actual incidence of positive Mantoux reactions for the first, second and third year classes amounted to 17.1, 19.0 and 25.6 per cent respectively. Although the class groups are too small to justify drawing any conclusions, nevertheless, these observations suggest that nurses in private hospitals become infected in gradually increasing numbers during the years they are taking training. Myers and Geer have demonstrated that tuberculous patients transmit

*Shows the number of patients, employees and nurses, together with the percentage of cases in each group who had positive Mantoux reactions.

their disease to their attendants, and have focused attention on the need of establishing contagious technic in hospitals for the purpose of protecting nurses and others.

TABLE II

	Cases	Average Age	Normal X-ray Per Cent	Calcified Hilus Glands Per Cent	Ghon Tubercles Per Cent	Adult Tuberculosis Per Cent	Pleural Thickenings and Effusions Per Cent
Patients	67	38	31.3*	41.8	13.4	7.5	6.0
Employees	53	35	39.6	17.0	35.8	3.8	3.8
Staff and Nurses	29	28	6.8	72.4	20.7		
TOTAL AND AVERAGE	149	35	29.5	38.9	22.8	4.7	4.0

The results of X-ray examinations of 149 of the 162 positive Mantoux reactors are recorded in Table II. As interpreted by the hospital roentgenologist, Dr. G. T. Nordin, chest films were entirely normal in 29.5 per cent (Table II) of the group. In the remaining cases, the lesions most commonly discovered were those characteristic of primary tuberculosis (calcified intrathoracic lymph nodes and ghon tubercles), which collectively were revealed by chest films in a total of 61.7 per cent of the entire group of 149 Mantoux positive individuals. In this respect, these adults resemble children who have positive tuberculin tests, for during childhood the prevailing type of lesions found by X-ray examination of infected children are those typical of primary tuberculosis.[3]

Of particular interest and significance was the discovery in this survey of pulmonary tuberculosis of the adult type in individuals admitted to the hospital for conditions other than tuberculosis. The admitting diagnoses in four of these instances were as follows: senility, asthma, nervousness and injury. In only one of these four cases (patient diagnosed asthma) did the physical examination reveal evidence of pulmonary pathology. Thus, without X-ray examination, these cases of unknown tuberculosis included in the patients admitted in January probably would not have been diagnosed during their period of hospitalization. The X-ray film of one of these four patients is shown in Figure 1, in which instance bilateral subapical infiltration in association with conspicuous ghon tubercles were found unexpectedly in X-ray examination of a positive tuberculin reactor.

In addition, two cases of incipient pulmonary tuberculosis were discovered among the employees. Each of these individuals was entirely free from symptoms and repeated physical examinations done subsequent to the discovery of the subapical infiltrations have been entirely negative. Aside from having positive tuberculin reactions and X-ray evidence of tuberculosis, the only additional indication of their disease is limited to the tendency noted for their temperature to become elevated slightly upon exercise. The chest film of one of these two employees is shown in Figure 2.

Comment.—This survey, although not extensive, sufficed to demonstrate that unrecognized cases of consumption are admitted to private hospitals in appreciable numbers. From our limited experience it seems that this applies particularly, but not exclusively, to instances in which the disease is present in its incipient stage, when symptoms and physical findings are prone to be absent, inconclusive and misleading.

During January, a few cases of consumption in rather advanced stages (not included in this survey) were admitted to the hospital correctly diagnosed on entry. To this group, the routine survey being carried on at that time added additional cases, the majority of which had incipient tuberculosis. The particular value of the survey, therefore, was confined more to the discovery of the incipient cases, the very type in which prompt recognition affords maximum opportunities for recovery.

In instances where the admitting diagnosis was tuberculosis, contagious technic was established

*Shows number of patients, employees, staff and nurses who had positive tuberculin reaction, and the percentage of various types of intrathoracic lesions found on X-ray examination for each group.

immediately, but similar protective measures were not instituted for four of the unsuspected cases accidentally discovered in this study until after the true nature of their disease was appreciated. The survey, therefore, was of additional value in demonstrating that a routine method of investigation, whereby unsuspected consumptives may be quickly identified, promptly informs nurses and attendants when institution of protective measures is desirable.

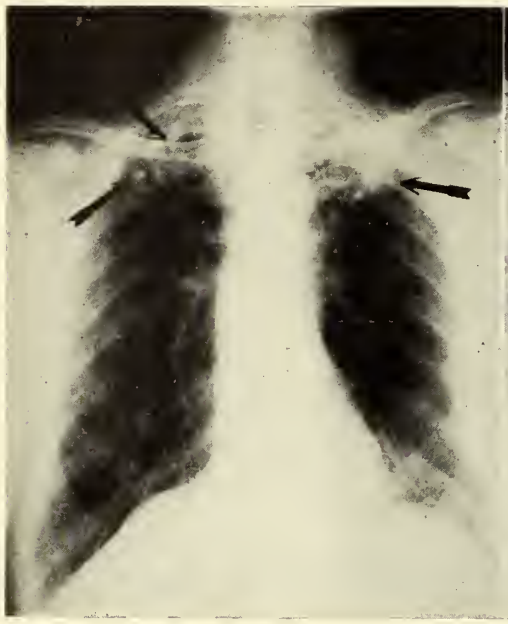


Fig. 1.

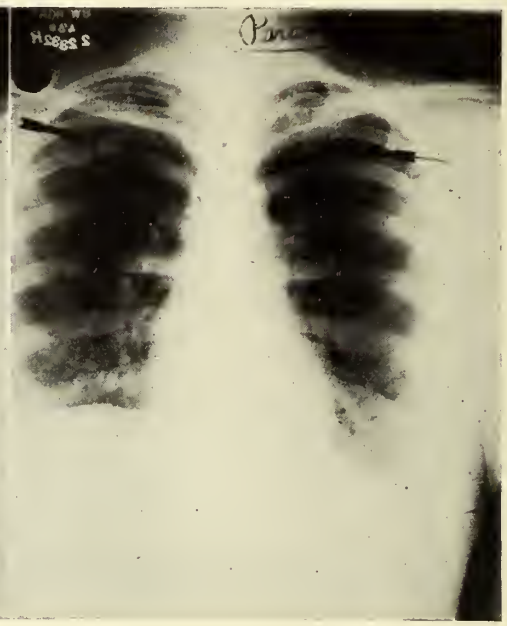


Fig. 2.

As a result of this hospital survey study, several of the members of the medical staff have adopted a plan of routinely tuberculin testing their private patients, whether adults or children, and to date, several patients having tuberculosis in its incipient stage have been discovered in this manner. Here again, the plan of tuberculin testing combined with X-ray examination of the positive reactors apparently is proving of value in discovering the incipient case that otherwise might be overlooked.

Undoubtedly, a large number of unrecognized cases of consumption pass through hospitals and private offices yearly, undiagnosed either because their disease is not sufficiently advanced to cause definite clinical symptoms or physical signs, or because some serious non-tuberculous condition conspicuously overshadows the situation. If, however, hospitals and physicians were to adopt a plan of searching for tuberculosis by routinely applying tuberculin tests and making chest films of positive reactors, many previously unrecognized tuberculous individuals would soon be sifted from the nontuberculous members of the community. In this manner certification with respect to tuberculosis of a considerable portion of the population would be accomplished, which probably would materially aid efforts directed toward the elimination of tuberculosis.

In 1916, the National Tuberculosis Association[4] passed a resolution recommending that general hospitals establish separate wards for the care of tuberculous patients. Five years later the American Medical Association[5] and the Board of Trustees of the American Hospital Association[6] adopted similar resolutions. Since that time hospitals, in increasing numbers, have followed the suggestions of these various national associations in providing beds for the care of consumptives. This necessitates the establishment in these hospitals of units in which contagious technic is rigidly observed, and carefully taught to nurses and attendants. The training obtained in contagious units of this type should prove of value to these institutions in causing an atmosphere of "technic consciousness" to permeate throughout the hospital, and in familiarizing nurses with a thoroughly effec-

tive method of self protection which they will need to use after graduation as well as during their period of training.

Equally rigid technic, no doubt, should be observed and practiced in hospitals that do not provide special beds for consumptives, since unrecognized cases of tuberculosis are admitted in appreciable numbers unless special diagnostic precautions are exercised routinely. The accidental entry of consumptives and also of patients suffering from other communicable diseases to hospitals not prepared to care for such diseases, places the patient in the midst of a group of young attendants untrained in methods of protecting themselves and others. It probably is preferable that such accidents occur in hospitals whose nurses, interns and doctors have been trained, as a result of experiences in the institution's special contagious unit, to be "technic conscious" at all times, and particularly when diagnosis is pending.

Reasons for and against general hospitals broadening the scope of service they render to their communities in providing facilities for the care of communicable diseases should be carefully considered. Practically all hospitals willingly accept patients suffering from communicable acute respiratory infections, and unwillingly, but accidentally, admit certain patients with other communicable diseases undiagnosed on entry. These latter patients ordinarily are transferred to special contagious hospitals when the true nature of their illnesses becomes apparent. This policy, however, makes the general hospital a contagious hospital temporarily with respect to certain diseases, and continuous with respect to other conditions, and creates a situation which may justify establishing a "contagious unit" within all institutions confronted with this problem.

The limit to which general hospitals can go in safely caring for patients with various communicable diseases depends largely upon whether or not technic can be perfected in such institutions to the point of reliability. When this is accomlished, need for special contagious hospitals will be eliminated.

SUMMARY

A tuberculosis survey of a private hospital for one month resulted in the discovery of previously unrecognized consumption in five patients admitted during that period for conditions other than tuberculosis.

In the majority of the cases discovered in this manner, clinical symptoms and physical findings indicative of tuberculosis were absent.

Among the employees minimal tuberculosis was found in two individuals, and in each case the disease could not have been diagnosed without X-ray examination.

The survey has given us a hospital certified so far as tuberculosis is concerned, and has afforded a special protection to the patients in guaranteeing them no danger of exposure to a tuberculous nurse or employee.

The certification of the hospital employees, nurses and attendants will be maintained in the future by repeated examinations.

The survey has made possible the graduation from the Swedish Hospitals one of the first classes to be admitted to the nursing profession certified with respect to tuberculosis.

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THE HARD OF HEARING PROBLEM*

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Saint Paul

IN the United States of America there are some ten million individuals who have suffered sufficient impairment of hearing to interfere seriously with their social and economic welfare. If this situation were unavoidable, it would not constitute a problem. On the contrary, there is little doubt that eight million out of the ten could have been spared this handicap in greater or lesser degrees, were we as a profession awake to the possibilities of preventive medicine in this neglected field.

It is, of course, important to recognize as early as possible minor defects in hearing in order that further loss may be forestalled, but it is of far greater importance that we recognize abnormal conditions of the nose and throat which in the huge majority of cases provide the foundation for future loss of hearing.

The hearing of children under eight years of age cannot be satisfactorily examined in large numbers, even with the present modern instruments; yet the nose and throat conditions, which so frequently result in loss of hearing, can be recognized at a much earlier age. After children have reached the age of eight it is possible to test rapidly and accurately large groups in their own school rooms and to detect slight degrees of impairment unsuspected by either parent or teacher which if allowed to continue unchecked, inevitably progress to major hearing loss.

The material for this paper is based on the results of an examination of 5,484 children in the St. Paul public schools conducted by the Division of Hygiene under the direction of Dr. W. J. Little and Mr. L. L. Everly. These tests were made with a 4 A Audiometer, an instrument which makes possible the testing of 40 children at one time, with the aid of two attendants. The hearing of several hundred children can be accurately tested in one day. There is, therefore, little excuse for any child in the State of Minnesota to be deprived of the benefits of this test. The instrument used by the St. Paul schools can be, and now is, being used to test out children in the smaller towns, the only cost being the salary of the trained attendant necessary for its operation. The instrument itself consists essentially of a phonograph record and an electric pick-up. Numbers are spoken by the record in both male and female voices and fed out electrically to the forty telephone receivers which are connected in series. One ear is tested at a time; the numbers spoken are written down by each child on a prepared blank, each succeeding number decreasing in loudness until the last are barely audible to one of normal hearing. When the child ceases to record correctly the number spoken or leaves the spaces blank, this point marks the limit of his ability to hear.

Hearing loss is measured in sensation units. Each sensation unit represents one-one hundredth of the auditory range which begins with the faintest sound audible to the normal ear and ends with the maximum sound which can be tolerated without actually becoming painful. It has been found that individuals who have lost nine or more sensation units in both ears are definitely handicapped in their school work. In such cases it is neither fair to the children nor economical for the public to try to educate these children in normal classes. They should by all means have the advantage of lip-reading instruction, making the eye substitute in part for the defective ear. Training in lip-reading is doubly important at an early age by reason of the well known fact that defects of hearing are too often progressive and in many instances the ability to read speech will be badly needed later in adult life when lip-reading is not so readily acquired.

If, however, we are to develop the full value of such tests, it is imperative that a careful and painstaking individual examination be made of every child whose hearing seems to be defective after having been tested and retested with the group audiometer. Such an examination should be made by a trained otologist and consists of

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not only a thorough clinical examination but also further tests with the 2 A Audiometer.

In order to emphasize the conditions which in our opinion are the basis for later ear involvement and loss of hearing, we shall take up the routine clinical examination of the children who have been found defective in testing with the group audiometer.

A careful history is of prime importance. Measles, scarlet fever, bronchitis, pneumonia, whooping cough, and above all the so-called common head cold are the principal causes of sinusitis and tubo-tympanic involvement. Mumps and meningitis have a predeliction for the auditory nerve itself. Absorption from any chronic focus of infection can produce the same results. Trauma at birth or later, is in rare cases a factor and should be recorded.

The examination is begun by an inspection of the mouth cavaties. A high, arched palate indicates present or previous nasal obstruction and carries with it the probability that the nasal septum has been crumpled and deflected by reason of the crowding upward of the palatal bones. Diseased tonsils and tonsil stubs cannot be ignored. Especially are we interested in the condition of the pharyngeal wall, and I wish here to call your attention to a tell-tale sign of chronic nasal sinus involvement, namely the presence of inflamed bands extending from above in the naso-pharynx down behind the posterior pillars of the tonsils. Small inflamed areas of granulation tissue studded over the surface of the posterior pharyngeal wall is indicative of the same condition, and when ropes of mucus or muco-purulent discharge are observed trailing down from the nasopharynx, there need be no doubt in the mind of the examiner that the sinuses are involved. A further examination of the naso-pharynx should be made when possible either with a laryngeal mirror or by digital examination, or both. The presence of adenoid masses or remnants thereof in the region of the eustachian tube orifice are of paramount importance.

Our attention should next be directed to the nasal cavities themselves. Very frequently it is found that by reason of injury to the nose in infancy and early childhood, caused usually by falling on the face in unsupervised attempts at walking, there is a marked deformity of the nasal septum causing in some cases complete occlusion of both nostrils. Too often we find in such a case that the child has been subjected to a second and even a third adenoidectomy on account of his mouth breathing when in reality the nasal obstruction was in the anterior part of the nasal chambers instead of the naso-pharynx. Muco-pus on the floor of the nasal cavities or emerging from beneath the middle turbinates is positive evidence of sinus involvement. Less striking, perhaps, but no less important are the presence of thick and reddened mucous membranes lining the nasal cavities and, particularly, enlarged and congested turbinate bodies. This condition is definitely secondary to inflammatory activity in the nasal sinuses.

Lastly our attention is directed to the ear itself. Any obstructions in the canal are of course noted and removed, and in a small number of cases we find that this condition alone is responsible for the diminution in hearing which has been recorded by the audiometer. Pus even in minimal amounts is of the utmost importance for it denotes active suppuration in the middle ear cavities. The condition of the drum membrane is next investigated. Scar tissue, perforations, and calcareous deposits are all the tell-tale tracks of purulent involvement of the middle ear or mastoid.

Perhaps of all lesions noted that of retraction of the drum membrane is most uniformly encountered. When the short process of the malleus is seen sticking up through the membrane like the center pole of a circus tent, you can rest assured that there is some obstruction which prevents the proper functioning of the eustachian tube and which will inevitably lead to further loss of hearing if uncorrected.

Having finished the clinical examination, there remains only the testing of hearing with the 2 A Audiometer to complete the necessary evidence in the case. This instrument produces not words, as with the Group Testing Audiometer, but pure musical tones progressing by octaves from the low note of 64 vibrations per second to the very high frequency of 8,096 vibrations per second. These tones can be decreased from a maximum intensity down to the point where the sound is entirely lost, and at this point the loss of hearing, again measured in sensation units, can be read off the scale and recorded on a graph. From this reading the percentage loss of hearing for the ordinary conversational voice

can be computed. In addition to measuring loss of hearing, the 2 A Audiometer is of very great importance in differentiating the varieties of deafness. In other words, the curve of hearing loss indicates quite accurately whether the lesion causing deafness is located in the conducting mechanism, the so-called catarrhal type (and this type makes up the vast majority of our cases), or whether injury has been done to the labyrinth and the auditory nerve, resulting in what is known as "nerve deafness."

With these facts in hand, it is possible to arrive at an accurate diagnosis of the condition and to determine the probable cause of the defective hearing. From the standpoint of the school system, it is necessary to make recommendations as to what type of instruction is best fitted to these individuals. In some cases it will only be necessary to give them a front seat position in the school room, while in others it is essential that they be put in special lip-reading classes. Recommendations for treatment to prevent further loss of hearing and improvement in the present condition are given, and the parents are urged to provide the child with the benefits of adequate otological treatment. They are advised to consult their own physician where this is economically possible. Individuals financially unable to afford the expense of such treatment should be urged to take advantage of the outpatient departments of the numerous clinics which are present in the larger centers of population.

Up to this point the situation is not unencouraging, but here we begin to meet obstacles almost unsurmountable. In the first place, many parents are entirely indifferent to the situation and refuse to concern themselves with the problem while in others active resentment is engendered and an attitude taken that the school system is encroaching entirely too much in a field that is none of its business. Unfortunately for the child, we cannot coerce an ignorant or stubborn parent to take care of his children's defects. Persuasion is our only recourse and the advice and encouragement of the well informed general practitioner is perhaps the most powerful influence we have in combating this attitude. Secondly, the most discouraging factor of all, from the standpoint of preventive medicine, is the fact that in many cases, even when the parents do consult their physician in regard to this problem, they only too often find him indifferent or uninformed as to the gravity of the situation. Minimizing the seriousness of the condition with vague remarks concerning the probability of the child outgrowing it, even though done with the best intention in the world of consoling or reassuring the parent, does the child an irreparable injustice and squanders precious time which could have been employed in checking the underlying cause and in conserving the remnant of hearing.

Our investigation indicates that at least 10 per cent of our school children are already started on their way toward serious loss of hearing and in some cases deafness. A far greater percentage possess defects and lesions of the nose and throat which will in all probability take their toll of the child's hearing if ignored and uncorrected. Here is a most fruitful field where prevention can work wonders. Nasal sinus infection must be brought under control. Nasal obstruction, whether traumatic, adenoid or turbinal in origin, must be relieved. The habit of forcible blowing of the nose must be discouraged at every opportunity, for this habit is too often the inciting cause of middle ear involvement. When acute infection of the ear has occurred, prompt and free incision of the drum membrane safeguards the organ of hearing. Long continued aural suppuration should not be tolerated. After a few weeks undiminished discharge, a mastoiditis must be considered. Early mastoidectomy in many cases would prevent an enormous and unnecessary loss of hearing.

Chronic purulent otitis media is a reflection on the profession. Careful cleansing of the canal, followed by insufflation of boric acid-iodine powder results in a dry ear in a surprising number of cases. Failure of this treatment indicates bone involvement and the necessity for adequate surgical treatment of the mastoid.

The responsibility for timely advice and adequate treatment rests squarely on the shoulders of the general practitioner and pediatrician. Assured of your active interest and coöperation in dealing with this problem, we can look forward hopefully to the time when deafness will not be abolished, but will be cut down to an irreducible minimum.

MEDICAL VIEWS OF A COUNTRY DOCTOR*

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IT is not my intention to give you something new or original in the field of medicine. It is seldom that anything original is brought out by the rural physician. The reason for this is obvious; his time is never his own. Often "three o'clock in the morning" finds him on his way to make a call or turning wearily homeward. Twenty years ago at that time he had the road to himself; now he shares it with bootleggers and what not, who would like to have it all. He is also called on to help in civic duties, and rarely says "no." Research work under these conditions is not encouraging.

Most of us must be content to attend medical meetings regularly, to absorb the good things brought out by leaders of the profession, to take them home with us and to apply them in our practice wherever we can. This must be our contribution to science, or should I say our contribution to the application of scientific medicine to mankind.

I am fully aware that I am facing a group composed largely of the leaders in the medical profession. Admiration of the work that these leaders have achieved and the association with many of you for years finds me still in the belief that medicine is the finest of the professions in which men are engaged. I know that I need say nothing to qualify this statement or to emphasize the rôle that idealism and altruism must play in the life of the physician, if this tribute is to be well deserved. I am not in accord with the statements made in Washington last winter before one of the various congressional investigations as to the sincerity of men in the medical profession in the writing of prescriptions for alcoholic stimulants. I think both the men that made these statements and the medical profession would have been much better off if our critics had tempered their criticism by a little generosity for their fellow men.

I shall give you in brief a few impressions gained from the practice of medicine for a period of almost twenty-nine years in one of the smaller cities in the southeastern part of Minnesota.

Twenty-nine years ago was the horse and buggy period. As I look back to those days, I see many changes which have taken place in the practice of medicine. The old family physicians with their distinctive dress and manner have become extinct. The mysterious and supernatural knowledge with which they were supposed to have been endowed counts no more since the triumph of scientific medicine. The muddy, rough and frozen roads, and the top buggy with its dim kerosene lights have given way to cement roads and the high powered automobile. Today the patient, no matter how sick he may be, is brought to the doctor's office, unless the tributary road on which he lives is impassable, in which case the doctor is expected to go through, although sometimes it is as difficult as in the early days. Thirty years ago nearly all the medical work had to be done in the home. The hospitals, which the patients feared, were few and distant. Today the patient's fear is gone; he now seeks the hospital with all its equipment and then tells us about the high cost of getting well.

Today, because of the great advancement in the science of medicine, the practice of medicine has become more and more complicated. We are not content with the usual physical examination. We want proof as we go along, and because of the accessibility to hospitals equipped with roentgen ray and other laboratories the physician is able to make more accurate diagnosis and to prescribe more intelligently than twenty-five or more years ago.

I am deeply impressed with the far-reaching effects that progress of medical science has produced on human society, especially on the communal life that we lead in this day.

Preventive medicine is really the accomplishment of the last generation, even though we must grant that it is built on the foundation laid by our fathers. Preventive medicine bids fair to remove many diseases altogether from the activities of the practitioner of medicine. It has already done so to a degree that would surprise the

*Address of the First Vice-President read before the meeting of the Southern Minnesota Medical Association, Rochester, Minnesota, September 12, 1932.

ordinary layman, as well as many young men who have entered the profession in recent years, and are unacquainted with the conditions of the practice twenty-five or more years ago. Conditions in medical practice have altered more than can be realized by any but the older practitioners themselves.

About two years ago at an alumni dinner of Rush Medical College in Chicago, Dr. Billings said in effect, "If science makes the same progress during the next fifty years, preventive medicine will have banished all of the usual illnesses, such as the infective fevers, by the control of the source of infection." Typhoid fever, for example, will be of interest to the sanitary engineer and the bacteriologist almost exclusively and by them it can and should be removed entirely from civil life.

Even as things are, we have examples of the manner in which scientific progress has modified the life of the practitioner of medicine in one generation. What has been said of typhoid can also be said of many diseases that once took their toll of human life and left other patients crippled to fight out their future in competition with more fortunate people. The change in the incidence of these diseases has had an influence on the life of the country doctor which is difficult to realize; that it constitutes a tremendous contribution to civilization cannot be doubted.

The work that has begun so well and which we are proud of, must continue; there is still much work to be done. The public is looking to us to conquer other diseases, especially cancer.

At the present time and for some time past, we have had disseminated over the air, medical information both good and bad. I wish it were all good. It takes so little effort to turn on a switch, tune in on a high-powered station and listen to fine sounding testimonials purporting to come from France or Germany which tell about the wonderful health properties of yeast or of some other medium to cure an ailment. From one station in our neighboring country to the south, your lost fortune can be restored, your fortune told, and a diagnosis and cure made; all this is done so simply over the air. How wonderful when reliable information is broadcast; how detrimental when misinformation is turned loose in the air.

Censure and censorship await the citizen or army officer who uses hot language over the air; but less harm is done by that than by the unreliable and inaccurate medical information which is allowed to pass unchallenged.

The effect that this medium of information has on the average innocent, uninformed mind is far reaching, and the cure much more difficult than we are able to achieve at this time. To cope with it, politics must be entered and the mighty dollar with its power in the lobby overcome. That the public can help us to help themselves must be borne in mind.

We are now striving for the passage of laws to better protect the public health, now seeking for the better regulation of the practice of healing disease; as a result of an enormous amount of labor and application and of an eternal vigilance on the part of a few in our medical organization, much success has been achieved. This program must continue, and it should be the duty of every medical man belonging to this or other medical organizations to do his bit.

I feel that it is up to every member to find out just how his legislative candidates stand on medical matters. Candidates for legislative offices should not be allowed to straddle on this point. If they believe that exponents of some of the various cults or paths should have equal rights with the well trained medical man, it should be our duty to do our best to keep them at home. That much at least should be our job, and if we do this it will make it much easier for our legislative committee to stop vicious legislation. Here we must ask the aid of the women, as they can, without any doubt, do more than we can. Their contacts in the various organizations will help to inform health-conscious mothers, and after all, they know how sickness wrecks a home better than anyone else. We must go forward and not one step backward.

In conclusion and in general, apart perhaps from strictly medical matters, I would like to call your attention to the present economic status. We have been and are living in a very serious and confused age for a much longer period than many had hoped; consequently there is an apathy among people that normally should and do take an active part and interest in local, state, and national governmental affairs. It is in times like these when there is a growing resentment among a class normally contented that red and communistic propaganda takes foothold, and any fine sounding theory is easily swallowed as a

possible panacea. I feel that neither this apathy nor this agitation is a good omen. It seems to me that it is our duty to show faith in our government, talk optimism instead of pessimism, and get into the habit of saying "better times are coming." We know they are, they always have, and if we can make someone, seemingly down and out, feel better, we have added just a little more happiness to life, which after all is part of our duty. "Happiness is the sum total of life."

INTESTINAL INTUSSUSCEPTION IN INFANTS WITH REPORT OF AN UNUSUAL CASE*

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INTUSSUSCEPTION is the chief cause of intestinal obstruction in children under five years of age. Fifty to 75 per cent of these cases occur under one year of age.

Many etiological factors have been suggested. The excessive motility of the intestine at the site of invagination should perhaps be mentioned first. It has been variously estimated that from 80 to 90 per cent of intestinal intussusceptions are of the ileo-cecal or ileo-colic variety. Usually in these cases both the cecum and ileum are freely movable.

Perrin and Lindsay maintain that the incidence of intussusception is directly proportionate to the development of lymphoid tissue in this area, which develops rapidly during the first year, and rapidly subsides during the second year; that gastro-intestinal upsets, resulting in swelling of lymphoid tissue are common, especially in the latter half of the first year.

John Fraser of Edinburgh calls attention to the fact that there is a slight intussusception present normally at the point where the ileo-cecal invagination begins; that close to 90 per cent of all intussusceptions occur at this point; that abnormal and irregular peristaltic rhythm are largely responsible for the beginning invagination.

Polypi or other tumor masses are, no doubt, responsible for this condition in a certain small percentage of cases.

The types of invagination are usually classified as: (1) large intestinal invagination; (2) ileo-cecal or ileo-colic invagination; (3) ileum invagination.

The cardinal symptoms of this condition are: (1) periodic attacks of colic or pain; (2) vomiting; (3) passage of blood and mucus by rectum; (4) tumor in abdomen.

Dragging on the mesentery as the intestine is telescoped perhaps accounts for the attacks of pain. During the free intervals the patient may lie quietly and in apparent comfort, have a normal temperature, good pulse, and a rather flaccid abdomen. The pale and characteristic apathetic facial expression during the attack is almost pathognomonic of this condition. It is common for an otherwise healthy child to awaken with a characteristic cry of pain as the first symptom of the attack.

Vomiting may begin soon after the onset of the pain, but may be delayed five to ten hours. The vomitus usually consists of food, first, then bile, and fecal material late in the attack.

Blood and mucus without fecal material per rectum is almost a constant symptom in invagination of the large intestine but not so common in that of the small intestine. The first movement after the onset of the pain may contain fecal material, but usually no more feces are passed.

An abdominal tumor in the form of a sausage-shaped mass may be palpated in about 70 per cent of cases. If not palpated under ordinary circumstances, light anesthesia may make this possible. The abdomen is usually of the scaphoid type early but later becomes distended.

Prognosis depends on prompt diagnosis and early reduction of the intussusception. The in-

*Presented before the Minnesota State Medical Association, Saint Paul, Minn., May 24, 1932.

tussusception may, in special cases, be readily reduced by so-called bloodless methods, but if not readily reduced such attempts should not be prolonged.

The danger of perforation and the lack of assurance of a complete disinvagination are the main objections to the bloodless methods. Recurrences are apparently not frequent but are best prevented by surgical intervention. During the early hours of the attack operation properly performed should give very good results.

As in all operations on infants, there should be a minimum of trauma, no great loss of blood, no extensive operation or prolonged anesthesia. If resection of the intestine is necessary, exteriorization with later repair may prevent a fatal termination.

Hirschsprung in 1906 reported 107 cases of intestinal intussusception encountered over a period of thirty-four years (1871-1904). His report, no doubt, would lead to the conclusion that the bloodless method of reducing this condition was the method of choice.

Professor Monrad of Denmark, a former pupil of Hirschsprung, reports very good results with this same method, and employed it in a large number of cases. But after his exhaustive work he makes this statement: "That reduction of the invagination by primary laparotomy is and must be the ideal treatment, all are agreed." He believed that the ileo-colic type should not be attempted by bloodless taxis. He stated that the ileo-colic and ileo-cecal types are difficult to differentiate. It is generally conceded that 80 to 90 per cent of all invaginations come under these two classifications. He therefore naturally infers that the bloodless method has a very limited field. After an exhaustive study of 115 cases he brought out some interesting facts which agree favorably with those of the most recent observers. Seventy-three of the 115 patients were under one year of age. Five patients had one recurrence; one had four recurrences. Seventy patients were males; thirty-five females. Only seven of these children were bottle fed, the rest being breast fed or breast plus supplementary feeding. Seventy-four were healthy and well before the onset of the attack, fifteen had diarrhea, and eleven gave evidence of constipation. Only a few had purgatives prior to the onset of the attack. In nearly fifty instances was the child an only child.

In reviewing the histories of a number of cases in Minneapolis hospitals we find that operation within the first ten or twelve hours from the time of the onset of the attack resulted in a very low mortality, while in those operated later than twenty-four hours after the onset, there was a very high mortality. In a review of twenty-seven cases occurring over a period of ten years in one hospital there was a 31 per cent mortality, while in another hospital, over a period of fifteen years the mortality was 15 per cent in forty-five cases.

In the first hospital referred to the twenty-seven patients were operated upon by nearly as great a number of surgeons, and, as a rule, the diagnosis was made rather late. In the latter hospital referred to, the operations were done by comparatively few surgeons and the diagnosis, as a rule, was made comparatively early.

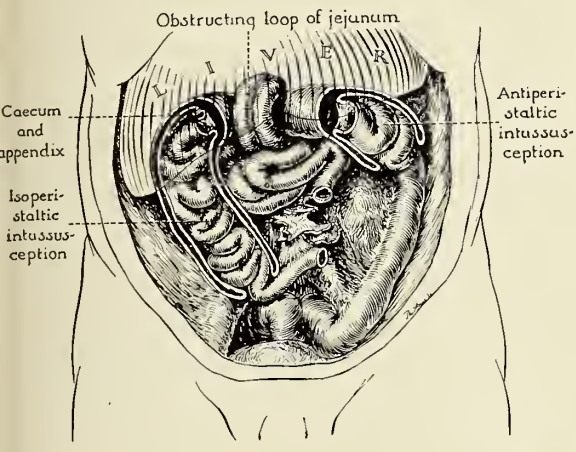
Here we must give the trained pediatrician credit for prompt diagnosis.

The case we have to report is, no doubt, an unusual one. So far we have been unable to find a similar case reported in literature. In this case there was present a double intussusception: the one in the isoperistaltic direction; the other anti-peristaltic direction.

CASE HISTORY

L. M. J., a male infant, eight months old, was first seen by us on October 15, 1931. The family and personal histories were essentially negative. The onset, four weeks previous, had been sudden. The child had been uneasy, vomiting appeared early and at times was projectile in character. The infant had cried continuously, had had blood streaked and occasional watery stools three and four a day, almost from the beginning. The baby was examined at the onset by his local physician in the country. He had a slight fever. The right ear drum appeared slightly red. There were some red blotches over the skin of the entire body but no vesicles nor pustules nor itching. The physician had little chance to observe the child, seeing him only on one occasion. He thought at the time the upset might be due to a slight middle ear infection or an enteritis. Soon the ear seemed to improve and symptoms subsided. About two weeks later, the above symptoms recurred, and again the child improved, though some diarrhea and vomiting was noted during the entire four weeks from the original onset. A third acute attack occurred twenty-four to forty-eight hours previous to the time of operation. The child was mentally clear throughout the entire period of illness. Sleep was disturbed during only two nights. The night before the operation the child awoke and cried vigoriously, and soon vomited even the water taken by mouth. The vomitus on the morning of the operation was greenish yellow in color. The stool showed a small amount of mucus and fecal material, but no blood.

On physical examination, the rectum was observed o open and a bulging mass could be seen. This mass vas not adherent to the mucosa of the intestine as high s the palpating finger could reach. The abdomen



could not be satisfactorily palpated until the child was given a light anesthesia, when a sausage shaped tumor extending obliquely across the abdomen just below the umbilicus could be palpated. The child presented a rather characteristically pale, apathetic, wrinkled face with open mouth and dry tongue. He cried at intervals and tended to lie on the right side more than the left. The turgor was extremely poor. The skin of the abdomen and thighs lay in folds; general emaciation and dehydration was very evident. The infant's weight was 17 pounds, 9.5 ounces; temperature 101.6°; pulse 160; respiration 52; hemoglobin 53 per cent. He was taken to the hospital at once and given subcutaneous saline solution preceding the operation.

A low right rectus incision about 2.5 inches long was made. A hard mass was felt drawn firmly against the posterior peritoneum and extending obliquely across the abdomen to the right of and below the umbilicus. The mass could not be readily brought up into the wound at first. The incision was extended slightly upward and at once a constricting band was released and the mass came up easily. This constricting band proved to be a loop of jejunum locked around the transverse colon, just to the right of its center. This loop of jejunum presented a dark appearance due to the marked tension. The mass which now was easily delivered was an ileo-colic type of invagination. The ileum, cecum, and lower ascending colon were telescoped into the colon to almost the mid-portion of the transverse colon. There was considerable acute inflammation and edema present but the invagination was readily reduced by gentle taxis. On further exploration another mass was palpated extending slightly obliquely and above the umbilicus to the left.

This was brought into the wound and found to be an invagination of the descending colon into the transverse colon extending almost to the point of constriction above noted. This also appeared to be somewhat inflamed and edematous but was quite readily reduced and all the contents quickly returned to the peritoneal cavity. The intestines were very carefully covered with warm packs at all times. The intestine was handled only with warm gauze in the gloved hand. The mesentery of both the small and large intestine was very long and gave free motility to the entire intestine.

On account of the extremely poor condition of the patient the entire procedure was carried out as rapidly as possible. Wherever possible, blood vessels were carefully clamped before cutting to avoid unnecessary loss of blood. Deep or prolonged anesthesia was carefully avoided.

Many operations have been devised for preventing the recurrence of intussusception. Those of Sir Berkeley Moynihan and Lamson seem most logical. Moynihan sutures the cecum and ascending colon to the lateral and posterior wall of the peritoneal cavity to prevent the excessive motility of this section of the intestinal tract. Lamson suggests an eversion operation at the ileo-cecal junction. He sutures the peritoneal surface of the ileum to that of the cecum on each side, thus producing an eversion rather than inversion which exists normally.

In our case the former method was employed. The wound was closed without drainage and heavy straps of adhesive drawn over the wound to prevent undue strain on the sutures.

As soon as the patient returned from the operating room he was given subcutaneous saline solution and two successive subcutaneous injections of 15 c.c. of whole blood.

The patient had a rather slow and stormy convalescence. He tolerated food poorly and excessive peristalsis was hard to control for a time. He was discharged from the hospital on the twenty-seventh day after the operation and has been well since.

Comment.—At first we were inclined to believe that the child's illness, four weeks before the operation, had begun with an attack of enteritis. The absence of high temperature at any time, the age, sex, onset of pain, vomiting, and blood streaked stools, the successive attacks with comparatively free intervals, leads us to the conclusion now that the child had successive attacks of intussusception with automatic reduction, until finally a complete obstruction persisted.

It is impossible to state definitely the cause of this unusual intussusception. We are perhaps justified in assuming that the ileo-colic invagination took place first. Traction on the jejunum evidently caused a constriction in the transverse colon. From this point on it would seem that a partial vacuum was created in the left transverse colon. With a normal slight anti-peristalic motion in the descending colon, this portion was readily taken in by the portion in which a partial vacuum was already created.

OFFICE MANAGEMENT OF STERILITY CASES*

Frank E. Kliman, Ph.C., B.A., M.D.

Duluth

THE subject of sterility is so wide in its scope that it would be folly to attempt a comprehensive presentation of the subject in a paper of this type. It is my purpose to define and classify sterility and also to outline a systematic course of study and treatment of patients who present themselves for office care.

STATISTICS

Walschied, in his studies of American women, states that 67 per cent of sterility is due to infantile uterus, adnexæ and ovaries. As the uterus of lactation atrophy closely resembles the hypoplastic uterus, care should be exercised in differentiating the two conditions.

Sterility is on the increase and is found in about 20 per cent of all married women. Two day dysmenorrhea of the non-obstructive type occurs in about 85 per cent of all sterile women. Cure of the dysmenorrhea frequently corrects the sterility, since the two conditions are often of common origin, namely, some intra-pelvic lesion. Ninety per cent of sterile women complain of pain and leukorrhea, both these symptoms indicating intrapelvic inflammation.

Rongy, who studied a group in Europe, found 13 per cent of the married women sterile. Pain, leukorrhea and bleeding were jointly present in 75 per cent of the cases. Of those 60 per cent had gonorrhea. Of all the sterile women he studied, 90 per cent had a genital discharge of some kind.

DEFINITION

In the broad sense of the word, sterility may be defined as a condition in which a woman does not conceive or bear a living child even though conception has occurred.

CLASSIFICATION

I. *Congenital sterility* denotes that a woman has had, from the beginning of sexual life, some condition responsible for her sterility.

II. *Acquired sterility* signifies that a woman, originally fertile, acquires a condition that brings about the sterile state. Under this heading are included the following:

(a) *Primary sterility,* which applies to women who, living with a fertile male, do not become pregnant during the child bearing period.

(b) *Secondary sterility,* which denotes those who have borne one or more children and thereafter have become sterile.

III. *Absolute sterility* signifies that the reproductive process is temporarily or permanently impossible, either due to suppression in the production of ova, or because the sperm temporarily or permanently fails to gain access to the ovum.

IV. *Relative sterility* is a state in which the initiation of the reproductive process, while not impossible, is impeded or made difficult for the following reasons:

(a) The ova and sperms are of inferior quality or deficient in number.

(b) The anterior pituitary secretion which is motor to and activator of ovarian function is either decreased in amount or absent. The majority of the endocrine disturbances are primarily due to disturbed function of the pituitary gland. However, disorders of the thyroid or ovary may be the cause of the sterility.

(c) The presence of chronic focal infections.

(d) Protein starvation.

(e) Tubal obstruction.

(f) Endocervicitis with altered viscosity of secretions causing mechanical obstruction of the cervical canal.

(g) Altered vaginal and uterine secretions.

PHYSIOLOGY OF THE FEMALE SEX HORMONES

There is definite clinical and experimental evidence to show that several hormonal principles are concerned with the regulation of the female sex cycle. Certain of these are produced by the ovary, whereas others are produced by the anterior lobe of the pituitary body. It is now known

*Read before the meeting of the St. Louis County Medical Society, Duluth, September 8, 1932.

that the anterior lobe of the pituitary elaborates, in addition to the substance which controls growth, substances which initiate and control the reproductive function.

The normal menstrual cycle depends upon the balanced activity of two ovarian hormones. The female sex hormone produced by the Graafian follicle produces growth and vascularization of the uterus. The lutein hormone, produced in the corpus luteum, initiates the premenstrual endometrial changes preparatory to the reception of the fertilized ovum. In the absence of the anterior pituitary hormones, the ovarian hormones cannot function.

During the first half of the intermenstrual period, providing the menstrual cycle is normal, the follicular hormone is produced, and attains maximum concentration in the blood fourteen days before the onset of the next period. This hormone serves to stimulate endometrial hyperplasia. Should pregnancy not occur, the endometrium degenerates and menstruation results.

The luteinizing hormone of the pituitary is required for development of corpora lutea. In addition, the pituitary elaborates two other hormones, one for initiating ovulation and the other initiates the production of Graafian follicles. Thus it becomes apparent that the sex hormones of the anterior pituitary maintain the full physiological activity of the ovary.

PROCEDURE IN THE INVESTIGATION OF A CASE OF STERILITY

There are certain fundamental and basic requirements for fertility.

1. Sperms must be normal.
2. The cervical and vaginal secretions must be normal.
3. The cervix, uterus and tubes must allow upward migration of the sperm and descent of the ovum.
4. The ovaries must produce normal ova.
5. The endometrium must be healthy to allow successful embedding and development of ova.

With the above facts clearly in mind, the physician should obtain a complete history of the husband and wife. Poor hygiene, anemia, chronic intoxications and sexual excesses should be ruled out. The investigation now centers around the wife. The menstrual history should include the time of onset, amount of flow, regularity, etc. This gives a clue to the possibility of endocrine disorders, since abnormal function of the pituitary, thyroid or ovaries may lead to an abnormal menstrual cycle, low fertility, sterility or even interruption of pregnancy in the early months.

Having completed the general history and physical examination of the female, the examination of the reproductive organs is carried out in detail. It is necessary to rule out uterine infections or displacements. The reaction of the vaginal and cervical secretions should be checked. Post coital examination of the semen should be made, and finally tubal patency tests should be done.

Post Coital Investigation.—The best time to carry out this examination is during the first half of the intermenstrual period. Examination should be made one hour after intercourse. The patient should be instructed to remain in the reclining posture for fifteen minutes following coitus, and not to void before the examination.

With a warmed, non-lubricated, speculum the cervix and posterior vaginal sulcus is exposed. The specimen from the seminal pool should be alkaline and contain many actively motile sperms. If this condition prevails the fertility of the male can be taken for granted. This test is more reliable than the examination of a sheath specimen. The post coital secretion of a normal cervix is usually glistening, of decreased viscosity and increased in amount. A thick tenacious mucopurulent discharge indicates an endocervicitis and often prevents fertility.

Having examined the seminal pool, specimens from the cervix should be examined. The first specimen is taken with a pipette from the mucus which has escaped from the vaginal surface of the cervix. A small amount of this secretion is spread on a slide and protected with a cover glass. If the sperms are sluggish or inactive, the mucus is unfavorable. If numerous well developed sperms are found traveling vigorously in the mucus, the male specimen is considered satisfactory regardless of the findings in the vaginal specimen. Next the vaginal surface of the cervix is freed from secretion. The tip of a sterile canula or pipette is introduced a short distance within the external os and a specimen obtained from the first part of the cervical canal. If difficulty is encountered in obtaining the specimen, or in expelling it from the canula, the viscosity is of an obstructive degree. Normally

many fast traveling sperms are found in all parts of the first intracervical specimen but many sperms lose their activity at this point. Continued rhythmic motion of the sperms without progress indicates abnormal viscosity of the medium. Abnormalities of cervical secretion from stenosis or passive congestion constitute the major cause of sterility in 10 per cent of cases.

If spermigration is active in the first specimen, migration is traced to the internal os. In normal cases there is active migration of the sperms in all the canal specimens for several hours. In the higher canal specimens the number of sperms is greatly reduced (3 to 10 per high power field). The cells have exceptionally long tails, and translucent, well developed, sharply outlined heads.

If bleeding occurs during a careful examination, an obstructive bleeding should be suspected. Microscopic bleeding can be ignored. If oozing occurs, the examination is terminated. If the normally patulous cervical canal is occupied constantly by a mucoid secretion so dense and tenacious as to resist removal or if the specimen removed is a long ropy mass, absolute blockade to sperm entrance is probable.

If spermigration failure is ruled out then the cause of sterility lies somewhere above the internal os.

The next procedure is the Rubin test or injection of lipiodol into the uterus. The technic of these tests is described in any textbook of gynecology and need not be repeated here. If the tubes are found patent, a basal metabolism is indicated, since many cases of low fertility are due to a low metabolism.

TREATMENT

General disturbances such as chronic alcoholism, anemia, syphilis, etc., should receive appropriate treatment. Inflammatory lesions of the uterus and adnexæ should be treated by means of vaginal douches, sitz baths, foreign protein therapy, electric cauterization of the cervix, etc. Uterine displacements should be corrected and maintained by means of a pessary.

Where endocrine disorders are suspected, the use of thyroid, anterior pituitary preparations and the various sex hormone preparations are often of benefit in regulating the menstrual cycle. Having established the normal menstrual cycle, where an irregularity previously existed, the Dickinson insemination test may be tried after all other treatments have failed to produce the desired results.

In summing up, I will present brief summaries of four cases of relative sterility treated in the office.

Case 1.—Mrs. Wm. R., aged thirty-two and weighing 185 pounds, consulted me in 1930 to determine the cause of her sterility. She had been married eight years and on three occasions had missed her period and then had a hemorrhage and passed some membrane. Each time her doctor had made the diagnosis of an abortion, but no fetus was found. Her periods started at the age of sixteen, were always irregular and at five to six weeks interval, of three days duration, and were accompanied by severe pain, passage of clots and stringy material like skin. In addition she complained of marked fatigue, leukorrhea, upper and lower abdominal pain, belching of gas, flatulence, dizziness and occasional attacks of vomiting.

Examination revealed tenderness over the gallbladder and the left ovarian area. The uterus was slightly increased in size, and pulled to the left. The cervix was slightly eroded and the cervical secretion increased in amount. There was tenderness of the left adnexa. A Graham-Cole test showed retention of the dye after thirty-six hours. No stones were visible in the gallbladder. The basal metabolic rate was minus 12. The Rubin test proved the tubes to be open, as air entered at a pressure of 160 mm. Microscopic study of a piece of membrane passed during menstruation confirmed the diagnosis of exfoliative endometritis. Otherwise the history and physical examination were negative.

Treatment consisted of an appropriate diet for gallbladder disease, small doses of thyroid gland, and cautery of the cervix. When pregnancy did not follow, three courses of the administration of female sex hormone were given. The periods became more regular and after two regular periods the patient missed a period and had slight spotting two weeks later. She continued with small doses of thyroid gland and six weeks later a Friedman pregnancy test was positive. The patient was kept in bed five days before the time her next menses was due. No further bleeding occurred. She was delivered of a normal seven pound girl at term. She stated that on the three occasions when she was supposed to have been pregnant she did not have breast symptoms or pigmentation of the areola as was the case this time. (Note: Patient has since had her gallbladder, containing many stones, removed.)

Case 2.—Mrs. R. M. O., aged thirty-three, consulted me in February, 1929, because she had failed to become pregnant although married three years. Menstruation had begun at the age of twelve, lasted three to four days at five to six weeks interval and was not accompanied by pain nor clots. As long as she could remember she had had leukorrhea and a feeling as though she were about to menstruate. Physical examination was negative except for the presence of a mucopurulent cervical discharge, cervical erosion and tender adnexæ. This condition cleared up with warm

louches and cautery of the cervix. Following the nenses in April, the patient flowed slightly off and on for two weeks. Except for slight tenderness of the adnexæ pelvic examination following this period was negative. In May the patient was still spotting a little each afternoon. A curettage specimen was diagnosed as chronic inflammation. The patient became discouraged at not becoming pregnant and consulted a gynecologist who did a lipiodol injection and advised her that both tubes were closed and an operation might be necessary before she could become pregnant. Not willing to have an operation she returned to my office in October, at which time a Rubin test was done. Air entered at a pressure of 120 mm. of mercury. After trying calcium, thyroid, etc., without success the patient consented to a Dickinson insemination procedure in November. In December she did not menstruate and the following August gave birth to an 8-pound baby. This patient is now pregnant again, normally.

Case 3.—Mrs. A. H., aged twenty-two, married three and one-half years, consulted me on November 11, 1930, because she had not conceived since she had had a missed abortion in July, 1929. Her periods had begun at fourteen, were always regular every twenty-three days, lasting two to five days. Flow had always been scanty. As a child she had measles and mumps but could not remember having had any ovarian complications at the time.

Physical examination and history were negative except that the patient had an increased cervical discharge which was more viscid than normal. This was cleared up with the electric cautery. The uterus and adnexæ were normal. Blood, urine and metabolism tests proved to be normal. Semen test proved the husband to be normal.

A Rubin test in November proved the patency of the tubes, as air entered at a pressure of 80 mm. The patient was advised that there was no reason why she should not become pregnant. Because the patient was discouraged and felt she would never became pregnant an insemination procedure was done in March, 1931. She missed her period in April and gave birth to a normal child on January 8, 1932. This patient is now three and a half months pregnant again, and conception has taken place normally. (Note: Since the reading of this paper, this patient was delivered spontaneously of a living male on December 26, 1932.)

Case 4.—Mrs. C. C., aged thirty-seven, consulted me September 9, 1930, because of sterility. Eight years previously she had two miscarriages and no conception had occurred since. Her menses had begun at sixteen years, were always painful and slightly irregular, but had been more irregular since her miscarriages. The history and physical examination were negative except that the patient had an anteflexed uterus and a tender prolapsed right ovary.

Between November, 1930, and April, 1931, the patient received several courses of ovarian hormone hypodermically as well as by mouth. Her menses appeared on time on April 17 and on May 16. Her last period was on June 19, 1931. She stated that her periods had become less painful since her treatment.

By July 28, 1931, the patient had not yet menstruated. Because she feared an examination might cause a miscarriage in the event she were pregnant a Friedman pregnancy test was done. This was positive. The patient was carefully watched for the next four months because she had repeated uterine hemorrhages. Since no fetal heart tones could be heard at five months and the patient had lost considerable blood, a diagnosis of missed abortion was made. In view of the patient's desire to have a baby, after consultation it was decided to treat the patient expectantly rather than empty the uterus. In January, 1932, the patient solved the problem by passing a hydatidiform mole.

This patient apparently developed an inflammatory condition of the ovaries after her miscarriages which caused marked irregularity of her periods as well as the sterility. When the menstrual cycle regulated itself she again became pregnant, had a missed abortion and later developed a hydatid mole. This patient was curetted after passing the mole and has had normal periods since March, 1932.

CONCLUSIONS

1. Sterility is more common than usually realized.
2. Each case of sterility presents an individual problem.
3. Systematic study should be carried on in each case.
4. Glandular and hormone therapy has a field of usefulness in the treatment of selected cases of sterility.
5. Many cases of sterility can be benefited by simple office procedures.
6. The Dickinson insemination procedure should be resorted to when other measures fail.

President's Letter

DEAR Fellow Member of this Association:

This is a personal inquiry directed to you who may read the letter.

I wish to ask you as an individual physician for your opinions and suggestions concerning the best method of furnishing medical and surgical care for those who are unable to pay.

Do you feel that the present plan of centralizing the medical care of the poor in free clinics and hospitals is a trend in the right direction,

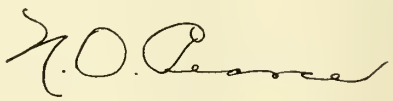
Or, Do you feel the State, County or Municipality should hire a physician to do medical and surgical work for the indigent in their homes,

Or, Do you believe the trend should be toward decentralization with care of the sick poor reverting back to the family physician of his choice with the State paying a modest minimal fee for such services.

There are obvious arguments which may be advanced for all these plans.

What is your opinion, or have you something different to suggest? Your reply to this letter will be appreciated and suggestions carefully considered.

Yours truly,



President,
Minnesota State Medical Association.

EDITORIAL

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TECHNOCRACY

The urge to discuss the present economic situation is irresistible although much of the present day talk on the subject is futile. The despair of the future, evident in some articles which have appeared in current magazines, is destructive to the return of confidence which is so necessary in business activities.

This applies to certain articles on Technocracy, about the exact meaning of which term no two individuals are likely to agree. Whether a technocrat is an engineer, an economist or a philosopher is not perfectly clear. Suffice it to say that some ten years ago one Howard Scott began charting the agricultural and industrial development of the United States for the past hundred years. The study and charting is being continued by a group of engineers at Columbia University. The result of the study has been apparently the incrimination of the machine as the cause of present economic difficulties, and the prediction seems warranted that a woeful amount of unemployment in the future is sure to persist from the replacement of workers by the machine.

We read about one Milwaukee industrial plant which has turned out 10,000 automobile chassis and thirty-four miles of pipe daily with a crew of 208 men; machines that make 2,500 cigarettes a minute instead of the previous maximum of 600. Also that it would have taken some thousands of copyists a year to get out the equivalent of one Sunday edition of a New York newspaper in 1400 A. D., and thousands more a year to produce the paper.

It raised us out of slough of despond to read an article by Thomas in the January *Nation's Business,* which instead of condemning the machine credits it with the enormous increase in the wealth of modern nations. It becomes perfectly evident that modern man owes a great debt to the machine. Although it has replaced numerous workers it has opened up new lines of activity for more. The textile industry in England is only one instance of many cited.

The automobile is another outstanding example, readily understandable, of new occupations developed by an invention. Activities associated with the use of the automobile have given employment to thousands. Although the automobile is often condemned as a man killer and an extravagant toy, we have often been thankful that we did not practice medicine in the horse and buggy days.

In the future new activities will continue to cause the abandonment of old methods, and certain individuals will suffer. A shifting of employment will continue to occur from one line of business to another. It would be foolish to attempt legislation to maintain specific jobs.

Certain discoveries and inventions in medicine and sanitation have led to the elimination of certain diseases which in the good old days were a great source of income to the medical profession. No one would advocate the curtailment of medical progress in order to provide more work for the medical profession. There have been replacements even in the medical field as a result of the machine age.

So we shall continue to be optimistic about the future, assured that supply and demand will

eventually become adjusted and that the machine age will continue to be accompanied by the production of new forms of activity which will more than compensate for the workers replaced in spite of Technocracy.

OVARIAN EXTRACT AND HEMOPHILIA

Occasionally one encounters a true hemophiliac—always a male who has inherited apparently a lack of something, which causes him to bleed excessively and often fatally from some minor injury or operation. It is because of the existence of these males that routine coagulation tests are required by many hospitals on pre-operative patients. One experience with a bleeder is quite sufficient for any surgeon.

It has long been recognized that the male and not the female inherits this tendency to bleed excessively, and that the female transmits the propensity. Estimations of the quantity of various elements in the blood concerned in coagulation, such as thrombin, prothrombin and blood platelets, have so far failed to uncover the reason for hemophilia. Recently, however, it has been shown that there is a difference in the composition of the blood of the normal male and that of the bleeder. That of the normal male contains what appears to be traces of the female sex hormone, while that of the bleeder does not.

In confirmation of these findings it has been shown that the parenteral administration of ovarian extract will temporarily correct this bleeding tendency in hemophiliacs. The discovery has proven life-saving in certain cases reported. In the preparation of hemophiliacs for necessary operations, ovarian extract is of great additional value. Injections are given the day preceding operation and continued until complete healing has occurred. Unfortunately, the effect is not permanent.

OF GENERAL INTEREST

Dr. Myron O. Henry, Minneapolis, announces the removal of his offices to 401 Medical Arts Building, where he will continue to specialize in orthopedic surgery.

Mrs. Louis P. Hiniker, wife of Dr. Hiniker of Saint Paul, died December 9, 1932. Mrs. Hiniker was a graduate of St. Mary's Hospital Training School and a resident of Minneapolis before her marriage.

The development of a portable instrument by R. C. Hitchcock of the Westinghouse Company for registering the acidity of fruit, vegetables and liquids may prove of value to the medical profession. With it the acidity of the mouth, sweat, and other parts of the body may be measured.

Six carloads, aggregating 95,000 pounds of wormy, frozen "mongrel whitefish" (tullibees), were seized recently by Federal officials at Baltimore, Md. The fish were shipped from the Lake of the Woods, Minn., region to cold storage warehouses in Baltimore, and were to be smoked and sold to consumers in the Central Atlantic States. Because of the presence of parasitic worms encysted in the flesh of the tullibees the fish were classified as adulterated under the National pure food and drug law and subject to seizure. National pure food officials consider worm-infested fish unfit for human food. Walsh has requested the Federal Court at Baltimore to order destruction of the seized stocks.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

JOHN GRANGER LOSES SUIT AGAINST MEDICAL BOARD

John Granger vs. Minnesota State Board of Medical Examiners

On January 3, 1933, the Honorable Frank E. Reed, Judge of the District Court of Hennepin County, made an order sustaining the demurrer interposed by the State Board of Medical Examiners in the action instituted by Granger against the Medical Board in August, 1932, whereby Granger sought to enjoin the Board by injunction from interfering with the conduct of his health audit business.

Granger alleged in his complaint that for the past seventeen years he had been engaged in the health audit business which business consisted of

"Four periodical urine analyses during the period of a year, with additional urine analyses where determined necessary. Plaintiff also extends to his subscribers one blood pressure test per year and additional tests if the same seem necessary and desirable."

Granger conducted his business by employing a licensed physician in Minneapolis to make the urine analyses. It was the contention of the plaintiff that he had a business that was bringing in, in the neighborhood of eleven to twelve thousand dollars per year. On August 24, last, he instituted his action to restrain the members of the State Board of Medical Examiners from in any way interfering with his business.

It was the contention of the Medical Board in the District Court that Granger was unlawfully engaged in the practice of healing. Granger not being licensed to practice medicine nor registered under the Basic Science Law. It was also the contention of the Board that the Board could not be enjoined from taking the necessary steps to put an end to the conduct of such a business by an unlicensed layman. Judge Reed stated in his order that Mr. Granger had not stated a cause of action against the Medical Board. Counsel for the plaintiff have announced that they will appeal to the Supreme Court of Minnesota from this decision. Mr. Granger was represented by Thompson, Hessian and Fletcher and Batten and Moore of Minneapolis. The State Board of Medical Examiners was represented by Henry N. Benson and James E. Markham, former Attorney General and Deputy Attorney General, respectively, and F. Manley Brist of St. Paul.

THALLIUM POISONING

The dangers of poisoning by thallium have been reported on. Its use as a rodent poison originated in Germany about 1920. Later, the remedy was introduced as a depilatory to be applied either locally as a cream or to be taken internally. During the past year or so, medical literature has contained reports of severe poisoning following the use of a proprietary depilatory cream called Koremlu, which had for its active ingredient, thallium acetate. In its action, thallium seems definitely to select nervous tissue. There is apparently no known certain antidote to the action of thallium. It is a cumulative poison of high toxicity, without taste, smell or other warning properties. (Jour. A. M. A., January 30, 1932, p. 406.)

OBITUARY

Adolph Hirschfield

1864-1933

Dr. Adolph Hirschfield, sixty-nine years old, north Minneapolis physician and surgeon for forty years, died unexpectedly late Tuesday evening, January 3, 1933, from heart disease at his home.

Dr. Hirschfield was born at Kovno, Lithuania, January 16, 1864, and received a classical education there and at Minsk. He moved to London in 1882, where for three months he was engaged in official business for the Russian consular service. He then returned to Russia as private secretary to a Russian noblewoman, later returning to London as correspondent for a Russian magazine.

He crossed the Atlantic several times as ship interpreter, and then in 1884 returned to Russia to present himself for service in the army. In 1886 he came to the United States to become a naturalized citizen.

He entered the college of medicine and surgery at the University of Minnesota and was graduated in 1893. At one time he was active in the Socialist party, twice being a candidate for congress.

He was chairman of the hospital committee of the board of charities and corrections of Minneapolis during Mayor Van Lear's administration. He was a member of the Hennepin County Medical Society, the Minnesota State Medical Association, American Medical Association, Saturday Lunch Club, A. O. U. W., and the Modern Woodmen of America.

He is survived by his wife, Gertrude A.; three sons, Leo M. of New York, Harry H. of Los Angeles, and Esmond of Minneapolis; one daughter, Miss Etta Claire of Minneapolis, and a brother, Dr. Max S. Hirschfield of Duluth, Minn.

Daniel Kriedt

Dr. Daniel Kriedt, 50, died Thursday, December 29, 1932, at his home in Minneapolis. He had been a resident of Minneapolis all his life.

Dr. Kriedt received his doctor of medicine degree from the University of Minnesota. Surviving are his wife; two sisters, Miss Anna Kriedt and Miss Julia Kriedt; and two brothers, Harry L. of San Francisco, and Gerhart of Manila, Philippine Islands.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Asssociation Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

Program for the month of February will be as follows:

February 1—Cardiac Neurosis.
February 8—The Cause of Backache.
February 15—After the Gall-bladder Is Removed.
February 22—Cancer of the Stomach.

THE STATE MEDICAL ASSOCIATION MEETING

A call for every available scientific film of interest has been issued by the Committee on Scientific Assembly to all members of the State Association. These films are to be used for the Scientific Cinema which is to be an important feature of the eightieth annual meeting of the society to be held in Rochester, May 22, 23 and 24, 1933. Eighteen films, most of them new, have already been submitted for the committee's consideration.

A wide variety of small group demonstrations is also under consideration by the committee as another exceedingly important part of the meeting program. These demonstrations, following the precedent set last year at the Saint Paul meeting, will be given for an hour each day in the same halls that house the scientific and technical exhibits. Among the subjects tentatively scheduled for them are many that were suggested by the membership on cards sent out last month by the committee. They include malaria treatment for syphilis; the Elliot use of heat in pelvic disease; physiotherapy for arthritis; injection treatment for hernia; autopsies; bruises and sprains; practical dietaries; interpretation of blood pictures; psittacosis; the state of vaccine treatment in lobar and broncho-pneumonia; diagnosis of early pregnancy; pernicious anemia; mucin treatment in peptic ulcer; liver and renal function tests; practical therapy for allergic states; oxygen therapy; fractures; hemorrhoids; spinal anesthesia; diathermy vs. surgery for tonsillectomies; plastic surgery; intravenous technic in leg ulcers; deformities after wrist fractures; tularemia; relation of streptococci to the etiology of ulcer; experimentally produced peptic ulcer; studies of gastric secretion; symptoms of hematemesis; lesions of the stomach; retinal hypertension; cancer of the uterine cervix; intravenous urography; ketogenic diet in urinary infections; technic of making and staining blood smears; differential characteristics of malignant cells; phtelometer and electromotive thermometer.

Prominent among other novel program features are the meetings of the special societies to be held Monday. These meetings will provide open programs on surgery, dermatology, obstetrics, heart, tuberculosis (arranged by the Trudeau society), orthopedics, eye and ear and X-ray.

Several symposiums of special interest are being arranged for the Tuesday and Wednesday programs. One of these is to be a nutritional symposium and another emergency surgery, with a pathological conference and a cancer symposium also under consideration. Subjects of papers to be read include pneumonia, gastric ulcer therapy, migraine, epilepsy, management of hypertension, management of cancer, asthma in infants and young adults, diabetic management in general practice, prevention of obstetrical catastrophes, industrial surgery with estimation of disabilities.

Clinics to be held in Rochester hospitals will occupy Tuesday and Wednesday afternoons. The usual social events, golf tournaments, luncheon reunions and banquet, together with various special tours, will complete the unusual three days' program.

The gold medal offered annually for the best individual exhibits submitted at the meeting by the Southern Minnesota Medical Society will be offered again this year. A large number of independent researchers have already indicated their intention to compete for this prize.

REDWOOD-BROWN COUNTY

The Redwood-Brown County Medical Society held its regular meeting with the hospital staff at Union Hospital, New Ulm, January 3. Eighteen physicians and six nurses attended the meeting. O. J. Seifert, New Ulm, showed a film on the subject, "Technic of Spinal Anesthesia."

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

What the Medical Journalists Say

Comment in current medical journals upon the reports brought in by the Committee on the Costs of Medical Care are interesting for their variety and comparative moderation.

Following are excerpts from journals that came in to State Society headquarters last month together with a biting observation upon the stand of organized medicine by a prominent signer of the Majority Report of the Committee.

Says Dr. James C. Sargent, Milwaukee, Chairman of the Special Committee on Distribution of Medical Service of the Milwaukee County Medical Society, in the Milwaukee Medical Times:

"In all probability, the greatest single result of this study will prove to have been that of creating a clear definition of the profound distinctions that exist regarding the practice of medicine as the economist thinks it should be and as the physician finds it to be. Both economist and physician should profit wholesomely by this clear expression of the other's viewpoint and it is high time that each awoke to the fact that there is another viewpoint.

"Lulled into self complacency by the remarkable scientific developments in medicine, physicians have been dangerously indifferent to the fact that the modern age of industrialism has come to demand profound changes in the economics of medical practice. Lured by certain isolated instances in which highly successful medical practice has prevailed under modern methods of "standardization," the economist and sociologist have come to develop a dangerous disregard for the age old fact that professional service acknowledges no masters beyond those of moral precepts and ethical principles. . . .

"The distorted perspective of the economist is clearly evident in the concluding paragraph of the Majority Report wherein this statement appears: 'All recommendations presented by the Committee are built upon existing institutions and agencies. The Committee does not propose the scrapping of hospitals, public health departments, clinics or other agencies.' But the Committee DOES propose the scrapping of the one institution that is the longest tried and best proven the most efficient and cheapest of all—the private doctor!"

From the Wisconsin Medical Journal:

"The recommendations of the majority of the Committee (on the Costs of Medical Care) will not come as a surprise to thousands of physicians who have followed closely the trend of the studies as indicated by the reports published from time to time since 1927. So definite was the trend of the Committee's studies in this direction that one must view the expenditure of almost a million dollars by the Committee and its final report with mingled amusement and regret. A colored boy spent a dollar taking twenty rides on a merry-go-round. When he got off, his old mammy said: 'Boy, you spent yo' money, but where has you been?' "

From the Journal of the Indiana Medical Association:

"Whereas the Majority Report takes 159 pages to deal in facts and figures and bring forth a theory, the minority report takes 32 pages to deal in theories and codes of ethics and bring forth facts. The majority story is that medical care can best be given the public by socialization of medicine; the minority story is that the individual patient suffers from socialization. The majority says that group practice and group payment is the solution; the minority says that such experiments as group practice and group payment have failed to produce better medical care in England, France, and Germany, where they have been tried. . . .

"The medical profession and the average citizen owe a vast debt of gratitude to the officers of the American Medical Association for the very existence of the minority report."

From the Illinois Medical Journal:

"Like the chain that is no stronger than its weakest link, no community is stronger than its individuals, nor wiser, nor more efficient. Destruction of the efficiency of the individual means destruction of the community. This destruction will find no small aid in the recommendation by the majority report that medical costs should be placed on a group basis through insurance, taxation, or both.

"Nowhere in all their costly research has the Committee been able to disprove the fact that 80 per cent of all human ailments can be treated best by the general practitioner and the remedies he carries in his satchel. Yet the majority report recommends elaborate machinery—lay controlled, of course—and even recommends extension and enlargement of public health service so that more service will be available to more people, and heartily urges further government invasion into the fields of medical practice. . . . This in the face of the fact that the government is neither an expert professional nor business man."

The following acid comment was made by Dr. Haven Emerson of Columbia University, signer of the Majority Report, in the December issue of the Survey Graphic:

"A half dozen physicians, more imbued than the rest of the medical members of the Committee with the present excellencies of private family practice, presented a minority report which rings with resentment and overflows with ambitious and unverified claims of accomplishment and promises of future progress. Why are they stung with even the gentlest implications of medical inertia and lack of effective leadership?"

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD NOVEMBER 3, 1932

The President, DR. KENNETH BULKLEY, in the Chair

CARCINOMA OF THE BREAST

DR. MARTIN NORDLAND reported a case of carcinoma of the breast which had been operated, with no recurrence in five years. Slides were shown.

DR. W. A. O'BRIEN (by invitation) pointed out the general appearance of the structure in the sections, noting some of it trying to form glands. This would be carcinoma of the breast roughly graded between II and III, probably closer to II after Broders' classification. It is very definitely carcinoma of the breast with metastases to the nodes.

CARCINOMA OF THE BREAST

DR. LEO MURPHY reported the case of Mrs. E. J., who was seventy-three years old when she presented herself in January, 1927, with reference to a lump in the right breast which she had noticed only two weeks before that time. Except for an automobile accident in 1926, in which she sustained rather severe contusion injuries to the entire right side of her body, her past history is unimportant. In the family history it was revealed that one sister died of carcinoma. The patient's attention was attracted to the lump in the right breast because of pain in that region. The record shows that at the time of examination a spherical, rather firm, freely movable, circumscribed mass 1 inch in diameter was palpated at the 9 o'clock position in the right breast. Axillary adenopathy could not be demonstrated. Except for essential hypertension, the physical examination was otherwise negative. X-ray of the chest was negative. At operation the mass was removed through a radial incision for immediate microscopic examination. The report given by the pathologist, Dr. E. T. Bell, was scirrhous carcinoma. Radical amputation of the breast was then performed. The axillary glands and gland-bearing tissue showed no metastases. A fairly good prognosis was given. This patient has had no X-ray therapy and there has been no apparent recurrence. The patient was presented, and lantern slide of the tissue was shown.

CARCINOMA OF THE GALLBLADDER

DR. LEO MURPHY reported the case of Mrs. P. W., resident of Saskatchewan, Canada. This lady was forty-five years of age when she presented herself here in January, 1927. Her family history was irrelevant except that one sister died of carcinoma. In 1926 this patient underwent operation elsewhere, at which time gallstones were removed and the gallbladder drained. It was eleven months later when she came to Minneapolis because of failure of the drainage tract to close. At examination a draining sinus was seen discharging a thin, cloudy fluid from the midpoint of the right rectus operative scar. The patient was of the obese type and had lost 32 pounds since the drainage operation. (It may be stated here that the suspicion of a foreign body was entertained.) X-ray examination of the sinus tract following injection with Beck's paste showed the paste extending through the abdominal wall apparently into the gallbladder region. X-ray study with the dye failed to outline the gallbladder. At operation incision was made excising the scar and encircling the sinus, which was found to lead directly into the fundus of the gallbladder. This was thickened and rather more firm than the usual chronic gallbladder. The liver appeared to be normal. Cholecystectomy was done, removing the fistulous tract in toto with the gallbladder. The pathologist's report was: gallbladder wall markedly thickened and very hard; marked ulceration of the mucosa; diagnosis—adenocarcinoma. This patient had a smooth convalescence. In a letter received from her three days ago she states that she has been perfectly well since this operation and that she has regained her weight. Lantern slide of the section was shown.

DISCUSSION (on above two cases)

DR. W. A. O'BRIEN (by invitation) stated that evidently the infiltrating cords and glands suggested the diagnosis of carcinoma. He called attention to the fact that there is sometimes a condition in the gallbladder where one catches infolding of the mucous membrane in cross-section. This lesion is very definitely malignant, and he said he would not hesitate at all to call it carcinoma. One can definitely see infiltrating cords of cells. In grading this it would be much less differentiated than the preceding case—probably somewhere between III and IV.

CARCINOMA OF THE BREAST (2 cases)

DR. THEODORE SWEETSER reported two cases of carcinoma of the breast.

Case 1.—The patient was a woman 39 years old with a medullary carcinoma in the outer margin of the left breast about 3 cm. in diameter and with axillary lymph node involvement. A radical operation was performed on August 4, 1927. She later admitted having first discovered it in April, 1927. In September, 1927, there was some apparent fullness about the left clavicle though no definite nodules could be found. Radium was applied (50 mgms. over four areas for four hours each). Radium was again applied in April, 1928, and in April, 1929. No definite nodules have appeared up to the present time and there is no evidence of pulmonary or bony metastases.

Case 2.—This patient was a woman 58 years old with a colloid carcinoma of the left breast with several axillary lymph nodes which, however, showed no carcinoma microscopically. Radical operation was performed December 28, 1927, with endothermy knife. There was no sign of recurrence until the summer of 1932, when a nodule appeared in the left chest wall some distance from the scar. It was excised widely and did not show any evidence of malignancy microscopically. Fluoroscopic examination of the chest showed a shadow in the left mediastinum; even with a film, the roentgenologist refused to make a definite diagnosis of malignancy. After a further period now of five months there is still no greater evidence of recurrence.

Features discussed with reference to these cases were the usefulness of endothermy, the use of radium postoperatively even on the suspicion of glandular involvement, and the lack of surety of permanent cure even at the approaching end of the 5-year period. It must be remembered that occasionally recurrences or metastases from carcinoma of the breast appear or become active even as late as 15 or 20 years after operation.

TERATOMA TESTIS, MIXED TYPE, INTRA-ABDOMINAL (eight year cure)

DR. R. C. WEBB presented the report of a man twenty-seven years of age when operated upon on January 21, 1925, and a teratoma testis which was located intra-abdominally was removed. The complete report of this case was presented before the Minneapolis Surgical Society at the meeting of February 5, 1925, and published in the transactions of the Society in MINNESOTA MEDICINE, June, 1925, page 408. The tumor

measured six inches long and four inches thick and was reported upon by Dr. E. T. Bell as a "teratoma of the testis of the mixed type." The operation consisted merely of the removal of the tumor.

The patient was then referred to Dr. R. G. Allison for deep X-ray therapy and he was given six treatments extending over a period of two weeks with a total of 1,150 milliampere minutes of radiation with a 200 kilovolts (Peak) filtered through one millimeter of copper and one millimeter of aluminum. Follow-up X-ray therapy was also given by Dr. Allison at a later date. The patient was referred by Dr. F. W. Wittick, who reports that the patient is in the best of health and six months ago left Minnesota and transferred his business to California, where the latest report says that there is no evidence of recurrence.

At the time this case was presented before the Society, attention was called to a series of 465 cases which were followed and 80 per cent were found to be dead and 5.5 per cent were proven to be living four years after operation. At this time this man lacks three months of having lived eight years following operation and there is no sign of recurrence. His last examination was in September, 1932.

CARCINOMA CASES, DISCUSSION

Dr. J. F. Corbett stated that recently there was reported to the American College of Surgeons at their meeting in St. Louis, 8,836 five-year cures of cancer. Before considering the postoperative expectancy it might be well to consider that Pfahler reported twenty-four cases in which three or more years had elapsed before any treatment. Further, Lewis and Rienhoff, in their review of cases operated at Johns Hopkins Hospital from 1889 to 1931, give the duration of onset to operation in 29 cases to be five years or more. Lewis and Rienhoff further state, "Whether a patient is ever completely cured in the pathologic sense of cancer is questioned."

To illustrate this, Dr. Corbett cited two cases: The first case is that of a patient with a melanotic sarcoma of the liver that twenty-four years previously had a melanotic sarcoma of the eye removed by Dr. Spratt. The second case is that of a carcinoma of the lung in a patient who had had a radical breast operation for cancer fifteen years before.

Of five-year cures, or apparent cures, up to date, Dr. Corbett reported: (1) one case of carcinoma of the stomach where pathology was well advanced but where no glands were found; (2) one case of carcinoma of the cecum, in which a very large tumor the size of one's fist was removed together with all tributary glands possible; ten years later the patient is apparently well; (3) one case of carcinoma in the recto-sigmoid region; the patient lived for five years but finally died from possible cancer.

Of cases of carcinoma of the breast, Dr. Corbett said he could point to but three five-year (or more) cures. A case of cancer en cuirasse disappeared, so far as external symptoms were concerned, after undergoing apparent cure with the use of X-ray. Two years later the patient died of cancer in the lung.

Local recurrence has been rare but metastases frequently appear in the spine, in the long bones, in the pelvic bones, in the lung, and, occasionally, in the brain. Such metastasis occurs early, as was demonstrated by a case from which Dr. Corbett removed a cerebellar metastatic carcinoma with a primary growth in the breast so small that it had escaped physical examination. Early metastasis is also illustrated by the common pathologic fracture of a long bone where growth in the breast was not known to the patient because of the small size.

Dr. Gilbert Cottam stated that he would like to report briefly a case which happened to fit in well with one of those reported by Dr. Corbett. This was a primary melanosarcoma of the right ovary, occurring in a single woman, thirty-nine, which Dr. Cottam had removed in April, 1915. The pathological examination was made in careful detail by Dr. Mortimer Herzberg, now pathologist to the Jewish Hospital in Cincinnati, who was able to satisfy himself that the growth was really a melanosarcoma. Dr. Cottam had reported the case quite fully, with the exhaustive pathological findings and bibliography, in the Journal-Lancet of August 15, 1915 (Vol. xxxv, No. 16, pp. 435-439). In view of the pathological report, the prognosis seemed uncompromisingly grave, but at last reports the patient was alive and well, continuing her work as a teacher in California.

Dr. H. B. Sweetser said he had made no investigation of his cases to report at this meeting. The series given here was a very interesting one because it means that all of these operations must have been very radical, going outside of any possible carcinomatous material. He felt that, with the better methods now in use, the results obtained in the prolongation of life should be much better than when there were so few facilities to be used in these cases.

Dr. A. T. Mann stated that many interesting points had been brought out in these reports. One of these is the length of time after operation at which recurrences show up. Those secondaries must have been there at the time of operation and been quiescent, otherwise the patient would have had a new cancer. Then the length of time these patients live: occasionally one will find a case that has gone much longer than one has reason to expect. Dr. Mann recalled two cases he had side by side at one time who had never been operated. One had scirrhous cancer of the left breast which she had had for over seven years; and the other had a rose cancer of the right breast which she had had over fifteen years. As to the question of interference in those cases, Dr. Mann said the rose case had consulted him because of a small bit of beginning growth in one spot in this mass caused by the infection of Alexander's Cancer Treatment by some one; so far as Dr. Mann could find out this was a carbolic acid solution, and the patient had a spot of accelerated cancer growth about 2 mm. in diameter beginning at the point of injection. That patient was dead inside of two and a half years. The other, which was thought to be scirrhous, was operated and she was dead inside of a year and a half. The mere act of interference in this quiet scirrhous cancer changed it into a rapid-growing cellular type.

Dr. Mann cited another case which was quite remarkable, the mother of a nurse. The mother did not like doctors very well and did not like operations at all, and she had had this tumor in the right breast for over three years. She then went to the "cancer specialist" across the river and he applied some cancer paste to eat it out. But the daughter who was a nurse thought her mother should be seen by a doctor and brought her in to Dr. Mann. At that time she had a cauliflower mass which was nearly three inches in diameter and projected one inch above the level of the skin, and she also had a mass of glands in the axilla. It was thought that was as nearly hopeless as a case could be. The situation was explained to the daughter, and she was advised that her mother might be made more comfortable if she wanted to be operated; that a cure was possible but not at all likely. Dr. Mann did a radical on her and she lived for nearly twelve years, during which time she had some very interesting recurrences. She developed secondaries in her lungs and was given heavy doses of X-ray, with resulting recession. After going along for quite a while, she began to have persistent bronchitis with cough, but Dr. Mann said he thought it was useless to subject her to anything more. At the end of three months, the bronchitis began to clear up. The patient took a trip out west to see another daughter, and back again. Later she consulted Dr. Mann and at that time presented a mass about three inches long in the glands of the neck. The mass was hard

nd nodular with fine nodules, and was cancer as far s could be made out in a clinical diagnosis. Again e thought the case was hopeless, and so advised the aughter. But at the end of six months' time, without reatment, this mass had gone away and nothing could e felt. Dr. Mann stated that the virility of these ancer cells, their activity and recessions of activity, s a thing one must think about in connection with hese cases.

Dr. C. A. O'Brien (in introducing Dr. Rector) said ie felt that most of those present are familiar with he organization of the American Society for the Con- rol of Cancer. Each state has a chairman. The Jnited States is divided into four districts, with a field- nan in charge of each district. Dr. Rector is field- nan for this district, which comprises Minnesota, Wis- consin, Iowa, Nebraska, Kansas, Missouri, Michigan, Illinois and Indiana. Dr. Rector is probably best known for his surveys of health and hospital conditions in state and federal prisons, and for state cancer studies. He has made cancer surveys in Wisconsin, Iowa, and n St. Louis, and has just completed the survey in Minnesota. He came here at the invitation of the Minnesota State Medical Association, through its Can- cer Committee composed of Drs. Robertson of Roches- er, Litzenberg of Minneapolis, Rothrock of St. Paul, and Collins of Duluth.

PRESENT-DAY CANCER PROBLEMS

Dr. Frank L. Rector (by invitation) of Evanston, Ill., read a paper on the above subject. (To appear later in Minnesota Medicine.)

DISCUSSION

Dr. Corbett asked if there was anything this Society could do that might be helpful to the American Society for the Control of Cancer.

Dr. Rector replied that the thing the National Society was interested in was how they could be helpful to the local societies. They do not undertake a program of any activity in any community until they are asked. There is always one thing to be considered in a community of the size of Minneapolis, and that is the organization of a local committee in addition to the State Committee. The State Committee in Minnesota has not yet been definitely formed. Dr. O'Brien is the head of the Committee but as yet no attempts have been made to do anything toward organization, and probably will not be until this report which Dr. Rector is preparing has been given out.

For a specialty organization of the type of the Minneapolis Surgical Society, the starting point of activity would be the appointment of a cancer committee from this organization. That committee and your Society would then be in a position to help in any undertaking that might be desirable in this city. Dr. Rector hoped it would be possible to develop one committee for the two cities or, if that is not practicable, a committee in both St. Paul and Minneapolis. If this Surgical Society had a cancer committee it would be one of the logical groups to turn to for help and cooperation in any movement of a city-wide character.

Dr. Rector stated he had only today finished the work in this state and he did not know yet just what the report is going to be, and nothing would be done toward a state organization until that report came out. He expressed appreciation to the various hospitals and pathologists, especially to Dr. Bell and Dr. O'Brien of the University. He felt there was a most unique coöperative spirit in this vicinity, and had no doubt that sooner or later there would be a very actively functioning local committee in these two cities in addition to the state-wide committee.

Dr. Bulkley expressed the thanks of the members of the Society to Dr. Rector for his very interesting talk.

F. A. Olson, M.D., *Secretary.*

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of December 14, 1932

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, December 14, 1932. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. J. C. Litzenberg. There were forty-three members present.

Minutes of the November meeting were read and approved.

The following memorial to the late Dr. R. E. Farr was read by Dr. E. L. Gardner, and a motion was carried that it be adopted and spread on the minutes of the society and a copy sent to the nearest relative.

ROBERT EMMETT FARR

1875-1932

Robert Emmett Farr was born at Montello, Wisconsin, on February 15, 1875. His parents were Irish born, and devout Roman Catholics. After graduation from the high school in Milwaukee, Dr. Farr entered Rush Medical School of Chicago, from which he was graduated in 1900. His contact as a student with the brilliant Rush Medical School group of surgeons, and with Dr. James Dunn while serving as an intern at the old St. Mary's Hospital in Minneapolis, stimulated his keen interest in surgery and especially in the possibilities of local anesthesia. He served as assistant and partner to Dr. Dunn for several years until the latter's untimely death. Dr. Farr was on the Surgical Staff of the Medical School of the University of Minnesota from 1902 to 1914, where he soon gained a reputation as a brilliant student and a most indefatigable worker. Very early in his career he recognized the possibilities of local anesthesia and was a pioneer in this field. All his spare time was devoted to anatomical research or to work in the department of experimental surgery. Much of the enormous expense for equipment, moving pictures of technic, and many other expenditures were borne by his own private income. His work became so well known that doctors, not only from all over America, but also from England, France, Germany and Australia came to his clinic to learn his technic and watch his operations. His contributions to medical literature, especially in the field of local anesthesia, were so well received that he was frequently invited to give clinics and orations all over the United States and Canada. Although at first his work was not always well received, the opposition only stimulated him to greater effort to prove his viewpoint.

In 1923 he published his monograph "Practical Local Anesthesia," although he had repeatedly delayed its publication until his evidence was sufficiently convincing to reach the critical reader. The book has passed through its second edition and is recognized throughout the world as one of the best textbooks on practical local anesthesia. For his pioneer work on local anesthesia, Dr. Farr's name was prominently mentioned throughout the United States as a candidate for the

Nobel prize, but finally failed to receive this recognition.

His contributions were also to the field of general surgery including works on cleft palate, abdominal surgery, fractures and other topics. His literary style was terse and readable; and his articles were always well illustrated with original drawings. His interest in medical literature was expressed by his keen interest and active part in the development of MINNESOTA MEDICINE, serving upon its Editing and Publishing Committee as long as his health permitted.

Dr. Farr's inspiration to young men is best known by the number of well-trained surgeons, with the best ideals of medicine, who received their training under him. It is known but to few that he aided many poor boys through medical school or advanced funds for young graduates with which to start practice. To the honorable physician who was down and out, his generosity with his encouragement, medical care, or with financial help seemed unlimited. Wherever he might be, in hospital, club or home, he was always surrounded by a circle of true friends. His human understanding and sense of humor always seemed to surmount the most embarrassing situation.

Dr. Farr always found time to attend medical societies, to participate in the programs, and to accept office when forced upon him. He was a past president of the Hennepin County Medical Society, and a member of the Minnesota State Medical Association, Minnesota Academy of Medicine, Western Surgical Association, American Association of Obstetricians, Gynecologists and Abdominal Surgeons and a Fellow of the American College of Surgeons. He was elected a member of this Academy in 1916, was an habitual attendant and frequently took part in its programs.

Dr. Farr was married to Miss Mary Scallen of Minneapolis. To this union was born one son, Paul, who died suddenly while studying medicine at the University of Minnesota.

Dr. Farr himself, in his college days, was a great athlete, having been captain of the Rush Medical football team and at one time football coach at Macalester College. Although a strong, robust young man, he later in life suffered a chronic ailment of the spine which caused him great pain so that for many years he had to wear an orthopedic support in order to do his work. While suffering this handicap, sufficient to have discouraged most men, he did the greater part of his research and writing. During the last four years of his life he was confined at home by intense suffering, but that indomitable spirit and optimism kept him at work revising his book, contributing to a system of surgery, and keeping abreast with the latest in medical literature. The death, first of his son, and then of his wife, seemed to be more than he could bear, but each time he mastered himself through the medium of his work. Medicine was his life, his play and his religion. He was a distinct personality, always ambitious and energetic, yet lovable and generous. He loved argument, fought for it when he thought he was right and admired others for doing the same; yet he was willing to admit when he was wrong. In spite of his many faults, which he himself knew and attempted to surmount, he nevertheless represented much of what is best in medicine.

The community, the medical profession and this Minnesota Academy of Medicine has lost a real friend and colleague in the untimely death of Robert Emmett Farr.

THE COMMITTEE:
JOHN E. HYNES,
C. N. SPRATT,
E. L. GARDNER, *Chairman.*

Upon ballot, the following officers were elected for the year 1933:

President, Dr. C. D. Freeman (St. Paul)
Vice president, Dr. A. E. Wilcox (Minneapolis)
Secretary-treasurer, Dr. R. T. LaVake (Minneapolis), re-elected.

The scientific program was as follows:

DR. F. H. K. SCHAAF (Minneapolis) read his Inaugural Thesis entitled "Recurrent Gout."

DR. ARNOLD SCHWYZER (St. Paul) read a paper on "Thrombophlebitic Sepsis."

DISCUSSION

DR. O. H. WANGENSTEEN (University of Minnesota): The principle of interrupting a septic process in a vein by ligation, incision or excision has become well established in surgery. The constant accompaniment of suppurative phlebitis is the septic venous thrombus, the early evacuation of which dispels the serious danger of multiple metastatic abscesses. Many of us, however, have not become accustomed to consider surgical interference in instances in which the network of veins involved present multiple possible avenues by which the systemic circulation may be threatened by septic thrombi and have limited our attempts at thwarting pyemic deposits in suppurative phlebitis to instances in which a single vein is usually concerned, such as one of the veins in an extremity; the angular vein of the face; the mesenteriolum of the appendix and the jugular bulb and lateral sinus (which does present in its tributaries, however, other anatomical paths for invasion).

The rich anastomoses of the veins of the uterus with the vesical, pudendal, and hemorrhoidal plexuses of veins suggests the diverse pathways in which the greater circulation may be menaced in suppurative thrombophlebitis of the uterine vessels. In order to preclude venous escape of a septic thrombus it would be necessary to ligate both ovarian and both internal iliac veins, a procedure which would necessitate an intraperitoneal approach and which would not permit of simultaneous safe excision of an encountered suppurative thrombosed segment of vein because of the attendant danger of peritonitis.

The remarkable results, however, which Dr. Schwyzer has obtained by interrupting suppurative thrombosed segments of veins by well-timed surgery in more chronic types of puerperal septic processes well justifies the procedure. For the suppurative thrombophlebitis of pelvic origin with its multiple threat for central spread, a restriction of surgical intervention to the localized thrombus as Dr. Schwyzer has described appears to be a justifiable indication.

A few patients who have had a recent appendectomy for acute suppurative appendicitis have later come under my observation with the typical picture of suppurative pylephlebitis. Almost invariably these patients give a history of a chill early in their course, synonymous with the presence of bacteria in the blood stream. During the course of an appendectomy for acute suppurative appendicitis in a young girl who complained of a "chilly feeling," but who had had no real chills, I once excised a thrombus about three inches in length from the mesenteriolum of the appendix extending well up into the ileocolic vein. The dreaded liver abscesses did not supervene.

Melchior has reported eight instances in which secondary surgical intervention with excision of a thrombus or ligation of the appendiceal branch of the ileocolic vein has been successfully done because of the persistence of chills. The ominous import of chills in appendicitis should be given wide credence. In all such instances the surgeon should carefully inspect the mesenteriolum of the appendix for evidence of a septic thrombus. Only one patient has come under my observation who has survived the typical picture of liver abscesses with jaundice and chills following appendectomy for acute appendicitis in which no direct attack was made upon the veins in the mesentery of the appendix at the time of operation. I gave the young man's physician and his parents a gloomy prognosis, but he survived to illustrate the occasional anomalous and singular course of diseased processes and the fallibility of judgment when based on seemingly dependable criteria.

MESENTERIC CYST

Dr. Martin Nordland (Minneapolis) reported the ollowing case of mesenteric cyst in a boy, nine years f age, with operation and recovery.

This patient is a boy, nine years of age, who was rst seen June 14, 1932. His health had been unusually ood until early in the morning of that day, when he egan to complain of nausea and loss of appetite. In ie afternoon he developed rather severe colicky pains



Fig. 1. Appearance of cyst on opening abdomen. Mass between stomach and transverse colon.

in his lower abdomen which seemed to localize more in the right portion than the left. They continued intermittently and the next day they were sharper and more frequent as well as accompanied with spells of vomiting. The evening of the second day the pain seemed to be located mostly in the right upper portion of the abdomen and for the first time a mass, lying to the right and just above the level of the umbilicus, was noticed by both the boy and his mother.

On June 15 the boy appeared fairly well; his temperature and pulse were normal and on physical examination nothing of note was found except a rounded movable mass in the right upper portion of the abdomen just under the costal margin. This measured 12 to 14 centimeters in diameter, it was not tender and it was not attached to either the posterior or anterior abdominal wall, although it lay quite close to the latter. Examination of the urine was reported as normal and the white cells numbered 9,600 per cubic mm. of blood.

Exploration of the abdomen through a right rectus incision was done June 17, 1932. A large rounded cyst, measuring 12 cm. in diameter, was present lying in the mesocolon between the greater curvature of the stomach and the transverse colon. In the process of removal of the cyst its wall was ruptured, allowing a dark red fluid to escape, but the margins of the cystic area were removed completely without interference to any of the large vessels of the mesentery or with the stomach or colon. The defect in the mesentery was repaired without difficulty. Convalescence was uneventful and the boy left the hospital the twelfth day postoperatively. He has been well ever since (Nov. 20, 1932).

Sections for microscopic study taken through the mass of tissue removed showed a massive infiltration with blood. No definite lining to the cyst could be made out.

In a recent review of twenty-two cases of primary mesenteric tumors, Rankin and Major found only two whieh were cystic sanguineous in character, such as that reported in this communication. Likewise from a review of the literature it seems that this type of lesion is quite rare. Moynihan has postulated that the usual etiologic factor in cysts of this kind is trauma and he further states that hemorrhages of this character and in this location may result in several alternatives: the hemorrhage may develop into a cyst; the hemorrhage may occur in a pre-existing cyst, or into a solid tumor of the mesentery; the greater part of the

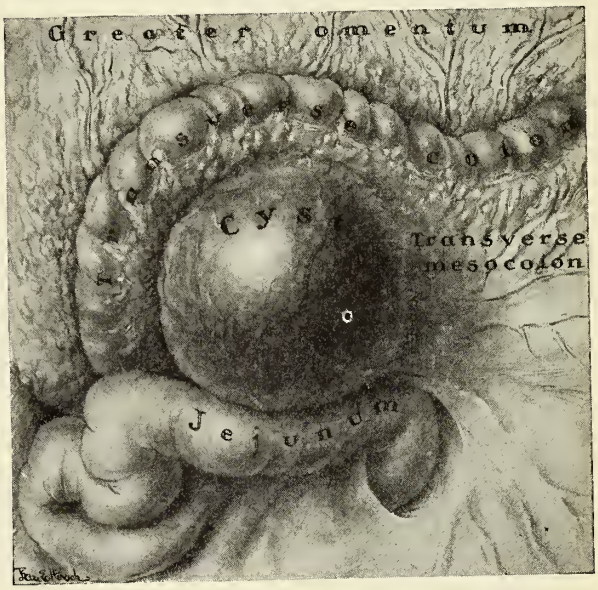


Fig. 2. Greater omentum and transverse colon pulled upward showing posterior surface of cyst.

solid constituents of the effused blood may disappear and a simple serous cyst result; or, finally, the fluid component of the blood may be absorbed and a more or less solid tumor persist. The solid tumors of this location are composed of the lipomata, fibromata and malignant neoplasms, especially sarcomata. The diagnosis of these tumors is not easy because of the multiplicity of symptoms which they may produce. However, in the presence of any mobile abdominal mass extrinsic to the gastrointestinal tract, mesenteric neoplasm should be borne in mind. According to Rankin and Major, the prognosis of benign tumors is favorable but in malignancies it is poor.

In the case presented, no doubt a trauma of some sort was the cause of hemorrhage into the mesocolon resulting in the formation of a hematoma, and this was removed before any complications could take place. The case is of interest from two standpoints. In the first place the differential diagnosis was difficult until the hematoma manifested itself by the presence of a mass. When this took place, surgical intervention was imperative. Secondly, the extirpation of the cyst was attended with considerable technical difficulty due to the proximity of the mass to the large vessels of the colon and stomach so that freeing and removal of the tumor was rather hazardous.

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DISCUSSION

Dr. O. H. Wangensteen (University of Minnesota): Primary tumors of the peritoneum are playthings of the surgical pathologist. The chief interest of surgeons in them is whether or not they can be removed and

knowledge of the fact that they are not readily identified preoperatively.

In the recognition of abdominal tumors, the teachings of Richard Bright still hold true. In writing on abdominal tumors he said, "The sources to which we turn for evidence respecting the existence and nature of abdominal tumors are the form and appearance suggested to the eye; the form still further discovered by

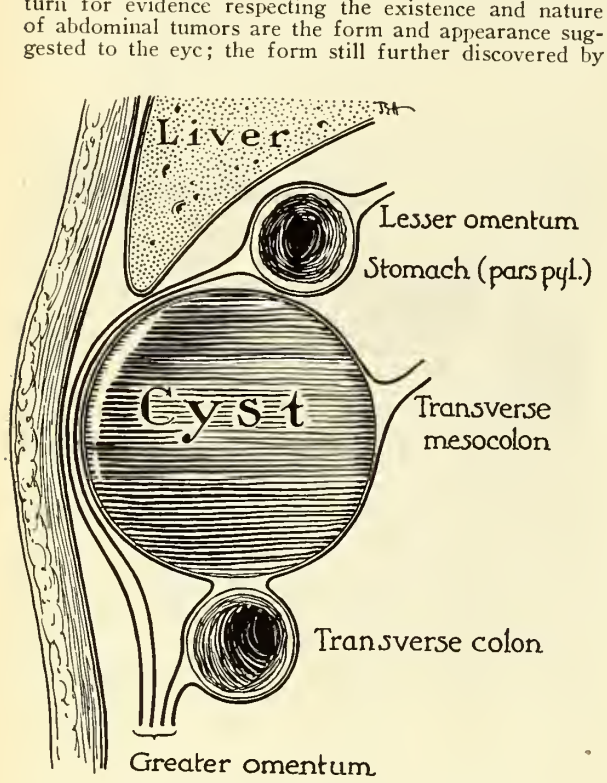


Fig. 3. Diagrammatic sagittal section illustrating position of cyst between the leaves of the mesocolon.

the touch; the resistance ascertained by pressure; the sounds elicited by percussion; and, in a few instances, the sounds perceptible to the ear, either alone or by the aid of the stethoscope; and besides these local and physical signs we look to the general condition of the system and of the various excretions as rendering us most assistance and being frequently indispensable toward the formation of a tolerably correct diagnosis."

Though our knowledge of abdominal tumors has been considerably augmented by frequent exploration of the abdomen, our criteria of physical examination are identically the same as those employed by Bright. The only valuable addition to our diagnostic armamentarium, as far as abdominal tumors are concerned, has been the X-rays. The manner of displacement of the stomach or the colon by the tumor mass as visualized after injection of barium gives valuable information of the location of the tumor.

There are three questions which one usually puts to himself in making any diagnosis, viz., (1) What is the functional disturbance? (2) What is the anatomy of the lesion? (3) What is its probable pathological nature?

In many acute as well as chronic ailments of the abdomen, the nature of the functional disturbance alone suffices to suggest the character of the pathological lesion. In the instance of a mesenteric cyst, however, there is often no functional disturbance and the pathological nature of the lesion has to be determined solely upon its anatomical relations, and remains unfortunately often a matter of conjecture until the abdomen is opened.

The value of inspection in the diagnosis of abdominal swellings was forcibly impressed upon me by the following case. A middle-aged woman with hypertension was admitted to the hospital from the medical clinic for paracentesis of the abdomen, the diagnosis being ascites. As the patient lay on the hospital litter with the abdomen bared, the attending surgeon, Dr. W. E. Sistrunk, who saw the patient for the first time across the room, remarked, "That is not ascites." An incision instead of paracentesis was made and two large ovarian cysts were removed. The abdomen of ascites is broad. The abdomen of a large intra-abdominal tumor is protuberant. The altered contour of the abdomen with change in posture should always be sought when free ascitic fluid is suspected as well as areas of shifting dullness as demonstrated by percussion.

The location of the protuberance is of great diagnostic importance in abdominal tumors. I recall hearing Dr. A. T. Mann, in discussing a paper on pancreatic cyst somewhat more than ten years ago, remark that Dr. J. Collins Warren, of the Massachusetts General Hospital, had walked into the operating theater when a patient with swelling in the left upper abdomen was being operated upon. The abdominal incision was being made. Dr. Warren said, "I see you have a pancreatic cyst." The surgeon stated that he had studied the case thoroughly and had failed to come to a conclusive opinion. The operative findings confirmed Dr. Warren's impression. Such a case came under my attention last summer. Mere inspection suggested the diagnosis though the patient had some months before been given several X-ray treatments under the diagnosis of a retroperitoneal sarcoma. On palpation, alternating fluctuant and solid areas were felt. The tympany of the stomach was percussed out over it. A diagnosis of cystadenoma of the pancreas was made. Fifteen hundred cubic centimeters of a brownish fluid in which amylase was later demonstrated was aspirated at operation. Extirpation rather than marsupialization was done because of the known tendency for malignant transformation to occur in cystadenomas of the pancreas.

Before the patient was dismissed from the hospital, another was admitted with the diagnosis of a pancreatic cyst. Though the tumor mass was said to be large on palpation, no visible protuberance was observed on inspection. The very absence of a visible protuberance when the mass itself is large, in my experience, rather militates against the presence of a cyst originating from the body or the tail of the pancreas. On palpation of the mass it was easily felt posteriorly in the loin by ballottement as well as anteriorly, suggesting the presence of a renal tumor, which impression subsequent pyelographic studies and operation verified.

In the presence of a movable tumor, the sector described by its displacement, as pointed out by Pagentecher, is of importance in determining its source of origin. An ovarian cyst can be displaced upward in only a limited fashion, but may be pulled into the bottom of the pelvis. A movable hydrops of the gallbladder has a slight range of motion downward, but may be pushed freely upward.

A large intraperitoneal tumor mass displaces the stomach and colon posteriorly, whereas a retroperitoneal tumor such as a large pancreatic cyst displaces the stomach and the colon against the anterior abdominal wall. Such displacements may be beautifully shown in a lateral film of the abdomen after the ingestion of an opaque meal. These displacements, as observed by the aid of the roentgen rays, though of extreme value, are not infallible in determining the intra- or retroperitoneal origin of a tumor mass. In doubtful instances the absence or presence of displacement of the ureter as observed after passing an opaque catheter will accurately determine whether the mass arises within or behind the

onfines of the peritoneum. An intraperitoneal tumor vill not alter the direction of the ureter, whereas a arge retroperitoneal tumor will distort its course.

Mesenteric cysts may partake of the physical findings of an intra- or retroperitoneal swelling, depending upon whether it grows forward between the leaves of the nesentery or expands in the retroperitoneal space. I should like to relate briefly the details of a case of nesenteric cyst that came under my observation a few nonths ago. A man, aged 65, came because of grad- ual enlargement of the abdomen. He had no other sub- ective complaints. A rounded protuberance (less abrupt han in pancreatic cyst) was present, the greatest prominence being to the right of and below the um- bilicus. The tumor mass was fluctuant and dull on per- cussion. It could be displaced freely from side to side, but only in a limited degree in the long axis of the nesentery. The displacement as visualized by the X-rays pointed to a retroperitoneal tumor. A diagnosis of mesenteric cyst was made. At operation 1,300 c.c. of a bloody fluid was aspirated, in which amylase later failed of demonstration. The cyst wall was adherent to the aorta and the vena cava. It was freed from the aorta with relative ease, but a small lateral tie had to be placed where it was finally cut away from the vena cava by sharp dissection. The bloody con- tent of the cyst may have been due to extravasation from the vena cava, which virtually ran through it. Convalescence was complicated by the occurrence of a small evisceration which healed without untoward event.

Mesenteric cysts are usually classified on the basis of their content. The serous cyst described by Dr. Nordland occurs most frequently. Chyle and blood mesenteric cysts are less commonly observed. A chylan- giomatous cyst of grape-fruit size in the mesentery of the sigmoid flexure was also recently excised at the University Hospital.

R. T. LaVake, *Secretary.*

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Akins, Willard Manville	U. of Minn., M.B. 1931	Mpls. Gen. Hospital, Minneapolis, Minn.
Berger, Alex Gorham	U. of Minn., M.B. 1931; M.D. 1932	1608 Plymouth Ave. N., Minneapolis, Minn.
Cairns, Robert Johnson	U. of Minn., M.B. 1932	Ancker Hospital, St. Paul, Minn.
Carlson, Carl Edwin	Rush Med. Col., M.D. 1931	Ortonville, Minn.
Cooper, Randall Eugene	U. of Minn., M.B. and M.D. 1930	State Hospital, Fergus Falls, Minn.
Emond, Joseph Samuel	U. of Minn., M.B. 1932	1227 6th St. N. E., Minneapolis, Minn.
Erickson, Paul Theodore	U. of Minn., M.B. 1931; M.D. 1932	Box No. 11, Wylie, Minn.
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Fuller, Alice Harrison	U. of Minn., M.B. 1931; M.D. 1932	900 Summit Ave., Minneapolis, Minn.
Graham, Albert Parker	U. of Nebr., M.D. 1931	Worthington, Minn.
Greengard, Milton	U. of Minn., M.B. 1931	Miller Hospital, St. Paul, Minn.
Hanover, Ralph Day	U. of Minn., M.B. 1931	Mpls. Gen. Hospital, Minneapolis, Minn.
Harrison, William Congdon	U. of Minn., M.B. 1932	St. Mary's Hospital, Minneapolis, Minn.
Harris, Ellis Harold	U. of Minn., M.B. 1931; M.D. 1932	3200 Irving Ave. S., Minneapolis, Minn.
Karleen, Philip Edward	U. of Minn., M.B. 1932	St. Mary's Hospital, Duluth, Minn.
Kaufman, Walter Bert	U. of Minn., M.B. 1931; M.D. 1932	St. Barnabas Hospital, Minneapolis, Minn.
Kennedy, Frank Sparling	U. of Western Ont., M.D. 1929	Mayo Clinic, Rochester, Minn.
Lymburner, Ross Martin	U. of Toronto, M.D. 1929	Mayo Clinic, Rochester, Minn.
McCormack, Christopher Jos.	Yale Univ., M.D. 1929	Mayo Clinic, Rochester, Minn.
McRoberts, Jerry William	McGill Univ., M.D. 1929	Mayo Clinic, Rochester, Minn.
Makaroff, William N.	U. of Minn., M.B. and M.D. 1932	2215 Blaisdell Ave. S., Minneapolis, Minn.
Malin, George Frank	U. of Minn., M.B. 1931; M.D. 1932	1404 Main St., La Crosse, Wis.
Moe, John Howard	Northwestern, M.B. 1929; M.D. 1930	2416 1st Ave. S., Minneapolis, Minn.
Nelson, Maynard Carl	U. of Minn., M.B. 1931; M.D. 1932	Lowry, Minn.
Newman, Erwin William	U. of Minn., M.B. 1931; M.D. 1932	3237 Garfield Ave. S., Minneapolis, Minn.
Nilson, Helmer Jonas	U. of Minn., M.B. 1931	University Hospitals, Minneapolis, Minn.
Pace, John McIver	Baylor Univ., M.D. 1931	Mayo Clinic, Rochester, Minn.
Pearson, Bjarne	U. of Minn., M.B. 1929; M.D. 1930	Taylors Falls, Minn.
Raymond, John Hardy	U. of Minn., M.B. 1932	815 8th Ave. S., Minneapolis, Minn.
Rieke, Wellington William	U. of Minn., M.B. 1931	Mpls. Gen. Hospital, Minneapolis, Minn.
Ritchie, Wallace Parks	Johns Hopkins, M.D. 1931	46 Crocus Place, St. Paul, Minn.
Ritt, Albert Eugene	U. of Minn., M.B. 1932	St. Mary's Hospital, Minneapolis, Minn.
Swenson, Roy Glen	U. of Minn., M.B. 1932	St. Mary's Hospital, Duluth, Minn.
Tuohy, Edward Boyce	U. of Pa., M.D. 1932	Ancker Hospital, St. Paul, Minn.
Weaver, Myron McDonald	Rush Med. Col., M.D. 1932	105 Winona St., Northfield, Minn.
Wells, Walter Bret	U. of Minn., M.B. 1931	Mpls. Gen. Hospital, Minneapolis, Minn.

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Miller, Frederick John	Jefferson Med. Col., M.D. 1927	318 Bush St., Red Wing, Minn.

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Hatch, Robert Willis	U. of Minn., M.B. 1931; M.D. 1932	701 6th Ave. N., Minneapolis, Minn.
Howell, Llewelyn Pennant	U. of Chicago, M.D. 1931	616 7th Ave. SW., Rochester, Minn.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

OFFICE SURGERY. Fenwick Beekman, M.D. Visiting Surgeon, Bellevue Hospital, etc. 402 pages. Illus. Price, $5.00, leather. Philadelphia: J. B. Lippincott Company, 1932.

PROCEEDINGS OF TWENTY-SIXTH ANNUAL CONVENTION, ASSOCIATION OF LIFE INSURANCE PRESIDENTS. 280 pages. 1932.

METHODS AND PROBLEMS OF MEDICAL EDUCATION. 226 pages. Illus. New York: The Rockefeller Foundation, 1932.

MEDICAL ENTOMOLOGY. William A. Riley, Ph.D., Sc.D., University of Minnesota, and Oskar A. Johannsen, Ph.D., Cornell University. 476 pages. Illus. Cloth. New York: McGraw-Hill Book Company, 1932.

FIFTY-FIFTH ANNUAL REPORT OF THE DEPARTMENT OF HEALTH OF THE STATE OF NEW JERSEY. 375 pages. Trenton, N. J.: MacCrellish & Quigley Company, 1932.

DISEASES OF THE CORONARY ARTERIES. Don C. Dutton, M.D., Associate Professor of Medicine, Northwestern University, and Harold Lueth, M.D. 164 pages. Illus. Price, $5.00. St. Louis: C. V. Mosby Co., 1932.

The increase in the incidence of cardiac diseases, whether relative or actual, is dependent upon the perfection and interpretation of the various diagnostic mediums and also upon a clear conception of cardiac physiology and pathology. The authors have compiled the important literature dealing with this complex clinical syndrome and have summarized the salient details of the anatomical, physiological and pathological factors, concluding with a comprehensive résumé of the pharmacology of the various therapeutic measures employed.

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C. K. WILLIAMS, M.D.

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MINNESOTA MEDICINE

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VOL. XVI MARCH, 1933 No. 3

THE COST OF MEDICAL CARE. WHY WAS THE SURVEY MADE? WHAT RESULTS WERE EXPECTED FROM THE SURVEY?*

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IN outlining what I believe to be the social aspects of these two important questions, my object is to suggest certain points of view that may be useful. It is a case of "The sociologist looks at medicine," to paraphrase a familiar title.

Why was this survey made? It was made to discover the main facts and the scope of the crisis that now faces the medical profession. As you all know, this crisis is not a mere "psychological" crisis. It is a grim and realistic situation. The report of the Committee shows that this crisis consists of a fundamental economic and social dislocation within the fields of medicine and public health. On the one hand, it is a demonstrated fact that the great middle classes of American society, particularly those portions that live in rural regions and in small communities, do not have available adequate medical service. On the other hand, it is a demonstrated fact that thousands of physicians, dentists, and nurses receive incomes that are below the reasonable minimum to which their long training and the costly investment in preparation entitle them. So much for a brief answer to the first question.

What results were expected from the survey? It was hoped that the findings of the survey would provide the basis for formulating a plan whereby the medical profession could avoid these two chief dangers in the present crisis. In my opinion the report does suggest a constructive plan that is in the main consistent with the best judgment of social scientists. So much for a brief answer to the second question. Let me now be more specific and attempt to interpret to you the meaning of the present social trends that affect the crisis and set limitations on any constructive plans to cope with it.

In the first place the reports of the majority and of the minorities of the Committee contain enormous quantities of facts gathered over a period of five years by scores of competent medical and lay people at a cost of $1,500,000. No such exhaustive study of medical care has ever been carried to completion by any other nation at any other time in history. The findings and opinions of the reports thus contain the most impressive body of evidence as a basis of planning that has been ever available to the medical profession. Furthermore, the composition of the Committee is so widely representative of different groups as to preclude provincialism and narrow bias. Financial support was supplied by eight national foundations and two other organizations. Parenthetically, I wish to say that Dr. Fishbein's editorial reference[1] to the part played by Mr. F. A. Filene through the financial support of the Twentieth Century Foundation sounds to me like an exaggeration, since the contribution of this foundation was but a small fractional part of the hundreds of thousands of dollars spent. For all these reasons I commend your deliberate and careful study of the entire mass of this factual evidence before you condemn officially either the majority or the minority reports.[2] As a sociologist who is familiar with the task of working over great masses of

*Presented at the Conference to discuss the Majority Report of the Committee on the Costs of Medical Care, under the auspices of the Minnesota State Medical Association, Minneapolis, December 18, 1932.

factual data and statements of conflicting inference and opinion, I consider that these reports fully justify the time and expense in making them.

What the committee tried to do and what it has done is to present a challenge to the American people as well as a summons to the medical profession to give an accounting! Judging by what I hear and by what I have read the medical profession appears to be aroused. I hope that this is true, since, if true, it shows that you are in a healthy emotional condition. No profession or group can maintain itself in this changing world if it complacently persists in obsolete forms of social organization. All about us today is the wreckage of banks, business firms and other enterprises, whose leaders were complacent yesterday and followed outworn forms of business organization to a certain doom. If the medical profession rises to this challenge of a new social system it can set its house in order. I regard the reports of the Committee on the Costs of Medical Care, both majority and minority reports, as an indictment of the present social organization of medical care. But these reports are more than an indictment, they are constructive in advocating a planned social organization of medical care to take the place of the existing competitive system with its isolated efforts, its aimless individual strivings, and its inevitable and costly conflicts. Sociologically considered, the crisis in medical care is in no small degree due to a combination, reinforcement and facilitation of countless individual forces in an unguided competitive society. Since we are all human it is difficult for us to see the major combinations of forces at work in the other fellows' province. Let me therefore take some examples from the other fields of human activity.

Considered as individual members of a profession you are like individual business men, bound up in a competitive chaos (often miscalled a competitive system). In the field of business enterprise this competitive chaos spread over the entire civilized world during the past century. The results of unplanned business enterprise are today known to all of you in the present world-wide depression. It would be possible to present to you the facts of labor turnover, unjustified capital investment, wrong marketing organization, inefficient and stupid management policies, which, in concrete case after case, demonstrate the inevitable outcome of individual effort conducted without regard to changing combinations of factors in the business world, or without regard to long-term planning. All questions of business ethics and service aside, we now know that there are elemental economic and social forces of an irresistible sort, which, when set in motion in an unguided competitive society, gather headway and sweep before them all obstacles, sucking into the maelstrom alike the deserving and the undeserving, until the crash comes and is followed by a long and painful process of liquidation. This was the case of the great bull market of 1929. Thousands of people speculated; competed among themselves wildly for ownership of securities until prices were far in excess of values and the bubble burst. Turn for a moment to another example of the same principle. I refer to the war debts situation. During the period 1918 to 1930 the United States consistently sold more goods in foreign markets than it purchased and yet foreign governments managed to pay their debts to us. Why didn't this happy process continue? Why are the nations now defaulting? The secret has at last leaked out. Private and individualistic American investors, unregulated and unguided, advanced new loans to Europe. Foreign nations merely used American money to repay American war debts as well as to purchase American goods. Thus we deceived ourselves as to the true situation. We had been merely taking money from one pocket and putting it in another pocket via foreign nations. When the real situation was discovered we stopped our foreign loans, and presto, foreign nations stopped paying their debts to us. Again, the millions of discontented feelings of our distressed people welled up, and in the enormous popular vote of 1932, swept out of office an entire political regime. Gentlemen, we are dealing also with great social, economic and political forces when we discuss this problem of medical care in an age of educated people and swift means of communication and transportation.

In the business field we have too many stores, too many factories, too many railroads, and too many farms. We have overproduced the articles and machinery with which to produce more of all these things. Meanwhile out antiquated organization for distribution cannot cope with shrinking markets and there is poverty and

want in the midst of plenty. Now it is no far-fetched analogy to the situation of medical care. We know and are proud of the rapid increase in medical knowledge. But we have produced more medical knowledge than we seem to be able to apply. There is a decided lag in the application of medical knowledge to the needs of the public. In short, our capacity of production has overextended itself as tested by our organized capacity to distribute the benefits of this knowledge. There is a maladjustment between the rapidly accumulating knowledge of specialists and the needs of the people for medical care. There are too many medical personnel in large cities and too few in the country and small communities. Both the majority and the minority reports agree that there are too few general practitioners and too many specialists. Like the maladjustment of supply and demand in the economic world, there is a dislocation between medical care and human need in the social world. And both maladjustments are in considerable measure due to the unguided activities of thousands of well-meaning individuals acting in a blind competitive effort without adequate perspective of the whole process. No single remedy for so complex a process is possible. The etiology is winding and tortuous and the treatment must be varied and experimental. Since in my opinion the causal factors are primarily economic and social, the treatment cannot, in my opinion, be individual, as the first minority report seems to contend. It must be social. What I mean is, that the remedies lie in adjusting and improving the social organization of medical care.

This observation leads me at once to an effort to interpret the recommendations of the Committee on the Costs of Medical Care. My opinion is that the reports of the Committee, especially the majority report, *set up for your consideration the principle of planned organization of medical services from the point of view of a survey of the whole process.* The Committee report forsakes once for all the obsolete laissez-faire idea of a blind struggle for existence and turns to the idea of rational organization that attempts to accommodate and guide the direction of the development of medical care in consideration of the major forces at work. As one who has had some practical experience in social planning and then in putting these plans into application, I regard the recommendations of the majority report, not as utopian and visionary, as Dr. Fishbein would have you believe, but as plans that embody the teachings of practical experience.

I interpret the first recommendation of the committee advocating group medicine as the outline of a plan that attempts to strike boldly at the economic and social factors that lie back of the present crisis. Observe, please, that the recommendation says medical service should be furnished "largely" by organized groups of medical personnel. Note the word *largely*. It does not say wholly or entirely. Furthermore, note the insistence on maintenance of "high standards" and also the emphasis not alone on the "preservation" of "a personal relation between patient and physician," but also on the "development" of this relation! In this connection let me remind you that the sort of charity that restores destitute persons to self-respect and self-support is no longer conducted by single, well-meaning individuals, but by trained social workers who operate from organized group centers. They do far more than merely "preserve" the personal relation, they have succeeded in developing it. Insistence on the maintenance of a personal relation between the patient and his physician should not be confused with a hazy desire to retain individualistic competition. The two things are quite separate. It is entirely possible to retain and to develop the personal relation between patient and physician and yet to do away with destructive individual competition. Note that I say "destructive" individual competition, for the majority report contemplates the continuance of the principle of free choice for those who desire it. In my opinion the medical profession has nothing to fear from the development of group medicine where and when it is necessary to adequate medical care as it is in some localities. But even this does not mean the universalization of group medicine. Do not forget the ease with which the medical profession was used by the conservative religious members of the community to resist the introduction of anesthesia eighty-six years ago[3] and even incited to persecute Dr. W. T. G. Morton, a discoverer of anesthesia. But today the use of anesthesia is an established practice. A century ago the objections to the establishment of the public school system were just as heated, just as

sincere, and just as futile as the present objections to group medicine. We now have magnificent systems of public education from the kindergarten to the university. A socialized system of education is accepted as a matter of course. But the private school and the private college have not disappeared. These institutions are stronger than ever. There is room for both because human life is so complex that it needs both.

The suggestions of the committee relating to the organization of groups are detailed and in the main socially and theoretically sound. Only experimentation and trial and error can determine the particular organization most appropriate for a given community. It is not possible in advance of experimentation to say with assurance whether the majority or minority proposals are right. The majority plan has one advantage, however, not shared by the minority plan, namely, that the planning groups should include lay persons. In a democratic society such as ours, experience has established the validity of the practice of wide representation of helpful interest on planning and governing bodies.

Since the second recommendation, advocating the extension of all basic public health services, is not so controversial, I shall next consider the third recommendation. This is that the costs of medical care be placed on a group payment basis, through the use of insurance, through the use of taxation, or through the use of both methods. The Committee states explicitly that this does not preclude the continuation of medical service on an individual fee basis for those who prefer the present method. I can appreciate that this recommendation comes as a shock to many of you. So much the better, because controversies make people think, make them attempt to justify procedures that are too often mere individual habit or use or wont. But let me insist that we examine this recommendation in the light of the principle that the costs of medical care should be considered from the point of view of a survey of the whole process and with a view to rationally planned organization. When one takes this position it is at once evident that the recommendation of group payment is not intended to be a legal requirement on all classes of the population. Insurance is designed only for those classes whose resources of intelligence, foresight or earning capacity are below the average and hence subject them to such insecurity that they become a menace to the rest of society, a burden on unorganized medical personnel, and a hindrance to the even and continuous operation of productive enterprises. Furthermore, tax appropriations from State and local governments are to insure hospitalization and other medical service for patients limited to those suffering from tuberculosis, mental disease, venereal disease, arthritis, and other chronic conditions, insofar as these persons are unable to provide suitable care out of their own resources. I fail to see anything socially unsound in such a plan. About the details of application there may well be disagreement, but the principle seems to me consistent with an effort to plan the organization of medical care in the light of the larger processes and trends of social change. Arguments to the contrary remind one of the opposition voiced a century ago to tax-supported schools, opposition two decades ago to compulsory workmen's compensation, opposition to unemployment insurance today; and yet tax-supported schools are an accomplished fact, workmen's compensation is accepted by employers in all industrial states, and unemployment insurance in Europe has, in the opinion of many thoughtful observers, prevented a social revolution and a lapse to communism.

Recommendation four—the study, evaluation and coördination of medical services as an important function for every State and local community, is one to which the majority and minority reports agree in principle, although they disagree as to the means of application. This recommendation gets at the very heart of the problem of maladjustment in the costs of medical care. It views the problem from the vantage point of envisioning the whole process and then proceeds to get down to practical details by the suggestion that *study* and *planning* should be a continuing and permanent function of local medical agencies. These agencies may well grow out of existing health councils, hospital councils or public health councils supported by Community Chests or Chambers of Commerce and local government or voluntary health agencies. The local county or city medical, dental, pharmaceutical and nursing societies should appoint committees to ascertain the facts regarding the local provision for medical service, and should include on such committees informed lay persons. More

permanent committees may be needed in some rural regions where provision for medical care is very inadequate. Finally, working up to the larger unit of area, there should be in each State a permanent organized agency for the *continuing study* of medical care, to prepare *a plan for its progressive development.* Particular attention should be paid to the development of adequate medical care in rural areas and to problems of the coördination of rural and urban services. Before setting up a new State agency, it would be wise to consider whether some existing board or commission can be used to adequately perform these functions. In my opinion the objections of the minority report to the recommendations of the Committee for group medicine in the form of medical centers and group payment, are based upon the assumption that group medicine is to be applied universally and without regard to local differences and needs. It seems to me perfectly clear that recommendation four provides exactly the social organization necessary to determine the possibilities of applying group medicine successfully. In other words, I am convinced that this emphasis on the organization of local agencies and committees for study and planning provides the medical profession with just the sort of check it desires on the dangers some believe to be inherent in socialized medicine.

The minority report recommending the trial of county and State medical societies as the agencies of study and planning, has the merit of utilizing existing machinery, and I cannot see that this idea is inconsistent with recommendation four of the Committee, *provided* the existing societies will meet intelligently the challenge of these changed times and furnish dynamic leadership in community planning. But when the minority report in recommendation six commends a careful trial of "methods that can be rightly fitted into our present institutions and agencies without interfering with the fundamentals of medical practice," I venture the hope that the mention of "the fundamentals of medical practice" has reference to scientific technic, an indispensable and justifiable limitation, and does not have reference to the present organization of medical care, which is far less well-developed than the science of medicine. In other words, it seems to me that improvement in the facilities for medical care should not interfere with the fundamentals of *scientific* medical practice. It all hinges on the use of the word "scientific," which unfortunately is not used in minority recommendation six. If the use of the word "scientific" was intended, then I agree to this recommendation. If, however, the minority intended to mean that the present organization of medical care is a sacred system not to be tampered with, then I emphatically disagree. In fact I am disposed to issue a warning. No minority is in a position to direct the course of social change to meet its own purposes, natural as such a desire is. One only needs to remind you of the impotence of certain so-called master minds of big business and big politics before recent tornadoes of social force. It is not a question of accommodating other institutions to any minority system; it is a question of fitting the organization of medical care to the pattern of more fundamental economic and social institutions in such a way as to preserve the essentials of medical science. The reasons why the choice does not rest with certain well-intentioned but misguided minorities is that, as individuals, we are all helpless before certain basic social changes. What are these social changes?

First may be mentioned the great trend of population to cities during the past generation. This particular social suction has drawn more medical personnel to the city than the city can support at an adequate income. And yet there are those who would interfere with the "right" of the individual to be drawn into a social maelstrom. Fortunately the process seems to have reached its saturation point. But there is still need of organized effort to stem the tide of medical migration to the city. The second great social change is that population has ceased to increase at its old accelerating rate. The rate is declining. Within a generation we shall attain a stable population. This means that services of all sorts can no longer count on boundless opportunities of expansion. It is going to be necessary for us to use our resources far more carefully than hitherto. The third great social change is linked up with the second; it is that the age group structure is changing. Our population is aging. I need not tell an audience of scientific medical practitioners what this is going to mean to medical care. The fourth great social change comes as a result of the shorter working day and the shorter working week. It

is that people will have more leisure time for education and self-improvement. Finally, great social changes are due as a result of synthetic chemistry. Even now the linseed oil industry of this region is about to be superseded by a superior and less expensive synthetic oil, just as was the natural wood alcohol industry destroyed almost overnight by the synthetic creation of this product. Already the Germans make synthetic gasoline and baser oils from lignite, and it may only be a matter of time when the Dakotas will be dotted with new towns built upon the manufacturing of synthetic oils and gasoline made from their immense supplies of native lignite. These are some of the great social and economic changes now in process. These constitute the evidence upon which the claim is made that as individuals we stand helpless before elemental social forces. Our salvation lies in creating a social organization, tough enough to resist violent changes and yet sufficiently flexible to admit of some degree of guidance and accommodation. Hence, my reason for not accepting Dr. Fishbein's contention that the report of the Committee proposes a plan that will lead to revolution. Gentlemen, the shoe is on the other foot. If an overconservative policy of undue resistance to inevitable social change is adopted, then indeed you may expect a revolution, a revolution about which there will be no mistake—it may be more nearly in the nature of an explosion. In my opinion, the Committee report presents the outlines of changes in the organization of medical care that may avoid revolution and lead in fact to an orderly evolutionary process.

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MAJORITY AND MINORITY REPORTS OF THE COMMITTEE ON THE COSTS OF MEDICAL CARE*

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IT is very appropriate that a layman lay a sociological foundation for this question first. I am given thirty minutes to discuss five years' work. In the thirty minutes I am going to make just a few suggestions rather than a discussion, and let you do the thinking. You will have to do it in the long run anyway. Your conclusion finally will be your guide which will shape your path.

Before I go on with the report itself, I am very much interested in one or two things that Dr. Chapin mentioned. One of them was the rapid change due to transportation. I just want to call it to your attention before I forget it. I imagine that in the last fifteen years a good many medical practitioners have had to move from their small town locations into the cities to save their practices. The place to get adequate medical care, in the opinion of these people, whether it was right or wrong, had shifted from the small town general practitioner's service which is now being suggested for the general public consumption to the city specialist. I wonder how we are going to change the idea of the general public on this particular thing. People generally will pass my office in a town forty miles from here and come to my confrere in this city, who does not know any more about it than I do, thinking that they are getting something better, perhaps. That brings the question a little more fundamentally, it seems to me, to the general consciousness of the people themselves regarding specialization or better practice, rather than just the matter of adequate care wherever you might get it.

This report which I have in my hand is the child of forty-eight people. I don't know just how the chromosomes are split or apportioned.

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Some of us have not claimed this child to any great extent. Some of us have even gone further than that and disclaimed him entirely, even though we have had some interest and some influence in his birth. We have one majority report, two minority reports, and two individual statements by committee members. In the majority report we find five recommendations. How many of you have read the five recommendations of the majority report? I should like to see how many really know what is in this. A very few. How many know what is in the minority report? The same number or less. The fact of the matter is we do not know very much about this report, do we? I am going to take the time to read some of these recommendations which have not been read. I will start with the first one. It has been stated by Dr. Chapin. This is the majority report:

"The Committee recommends that medical service, both preventive and therapeutic, should be furnished largely by organized groups of physicians, dentists, nurses, pharmacists and other associated personnel. Such groups should be organized preferably around a hospital for rendering complete home, office and hospital care. The form of organization should encourage the maintenance (*should encourage the maintenance*) of high standards and the development or preservation of a personal relation between patient and physician."

As a start, I will say that the premise laid down by the chiarman of this committee of forty-eight, as it turned out to be, was that we should not disturb the personal relationship of the physician and the patient if we wanted to keep medicine on the high standard that it is at the present time.

"The Committee recommends the extension of basic public health services, whether provided by governmental or nongovernmental agencies, so that they will be available to the entire population, according to its needs. Primarily this extension requires increased financial support (I am glad that is brought in there because I want to say something about that) for official health departments and full-time trained health officers and members of their staffs whose tenure is dependent only upon professional and administrative competence."

Before I go any further, if we are studying this report, including all of the studies, we will find that if we extend medical care to all of the people adequately, as this recommends, the medical bill will not be $3,500,000,000. In dentistry (I can talk about that because I happen to be a dentist) it will be three times that figure at least, because we are doing adequate dental operations for about one-third of the people, or less. We had a little private fight in the committee about the name "The High Cost of Medical Care" which was given to the committee in the beginning, and finally was changed to "The Costs of Medical Care." It could just as well have been left "The High Cost of Medical Care" because if the recommendations of this majority report were to start functioning tomorrow, our medical bill would be considerably more than it is at present. However, we are given this assurance by leading economists, that this country can stand a medical bill of at least $6,000,000,000 without any trouble, and should.

The third recommendation:

"The Committee recommends that the costs of medical care be placed on a group payment basis through the use of insurance, through the use of taxation or through the use of both of these methods."

Before I go on with this, I shall simply say that if you have studied the question at all you know that this is the only outstanding country that is not socialized, medically speaking. To the best of my ability I have been trying to find reports from the other countries as to whether the people dispensing medical care are anxious to go back to the old system of private practice. I shall be glad to get this information from anybody who has it. The information I can get is that they are more willing now to get the "bugs out of the machine" they have (that is putting it in the parlance of the street) and not go back to the old system.

I can point out countries which this would involve. One country is England. You know that it was socialized in 1911 by parliamentary vote. This meant that we as physicians and dentists in England could have had something to say about the radical change had we wanted to; instead, we did not say anything excepting that it could not be done. Then we said, "It must not be done." The next day it was done, without any of our recommendations.

Digressing a little, we can take the same attitude here if we care to. In the Minority Report No. 2 you will find the statement that "we think it is dangerous for the professional group to stand aloof or actually oppose something the pub-

lic wants" because the public gets what it wants, whether we like it or not. Better, that we have an idea and present it. This idea must be sound from a medical point of view, sound from a sociological point of view, and sound from an economic point of view. We can get men outside of the professions, if we do not feel ourselves capable, to give the general tone socially and economically to our recommendations. This is not meant to preclude the continuation of medical service provided on an individual or fee basis, for those who prefer the present method.

"Cash benefits, that is compensation for wage loss, due to illness, if and when provided, should be separate and distinct from medical services."

This is simply stating a fact that has sadly interfered with practically every system which has been put into practice in any of the countries. This fact should not be overlooked in this country, for it is a fault which we have in some of our insurance systems which are in vogue at the present time in different parts of this country.

"Fourth. The Committee recommends that the study, evaluation and coördination of medical service be considered important functions for every state and local community, that agencies be formed to exercise these functions, and that the coördination of rural with urban services receive special attention."

That has been covered very well by Dr. Chapin.

"Fifth. The committee makes the following recommendations in the field of professional education (and here we have something new): That the training of physicians give increasing emphasis to the teaching of health and prevention of disease; that more effective efforts be made to provide trained health officers; that social aspects of medical practice be given greater attention; that specialties be restricted to those specially qualified, and that post-graduate educational opportunities be increased.

"(b) That dental students be given a broader educational background.

"(c) That pharmaceutical education place more stress on the pharmacist's responsibilities and opportunities for public service.

"(d) That nursing education be thoroughly remolded to provide well-educated and well-qualified registered nurses."

I am going to stop here a moment. We are graduating about 20,000 nurses a year in this country. I don't know just what the average income of the average registered nurse is, but it is about $1,000 or less. There is no question but that we have problems in our own backyard which should be solved, economic problems in our own professions, and this is one of them, it seems to me. I just wanted to call your attention to it.

"That less thoroughly trained (and this is something new that is being recommended) but competent nursing aids and attendants be provided. That adequate training for nurse-midwives be provided, and that opportunities be offered for the systematic training of hospital and clinic administrators."

This will have something to do with our educational program. Without any further comment on phases of the majority report, I am going to read the recommendations of Minority Report No. 1:

"No. 1: The minority recommends that government competition in the practice of medicine be discontinued, and that its activities be restricted (a) to the care of the indigent and those patients with diseases which can be cared for only in governmental institutions; (b) to the promotion of public health; (c) to the support of the medical department of the Army, Navy, coast and geodetic survey and other service which cannot, because of their nature or location, be served by the general medical profession, and to the care of veterans suffering from bona fide service-connected disabilities and diseases, except in the case of tuberculosis and nervous and mental diseases.

"No. 2: The minority recommends that government care of the indigent be expanded with the ultimate object of relieving the medical profession of this burden.

"No. 3: The minority joins with the committee in recommending that the study, evaluation and coördination of medical service be considered important functions for every state and local community, that agencies be formed to exercise these functions, and that the coordination of rural with urban services receive special attention.

"No. 4: The minority recommends that united attempts be made to restore the general practitioner to the central place in medical practice.

"No. 5: The minority recommends that the corporate practice of medicine, financed through intermediary agencies, be vigorously and persistently opposed as being economically wasteful, inimical to continued and sustained high quality of medical care, or unfair exploitation of the medical profession.

"No. 6: The minority recommends that methods be given careful trial which can be rightly fitted into our present institutions and agencies, without interfering with the fundamentals of medical practice.

"No. 7: The minority recommends the development by state or county medical societies of plans for medical care.

"The minority group of the committee whose names

are subscribed to this report are in accord with the majority in many of their conclusions and recommendations."

The last statement gives you an idea that we are in accord with the majority in some of its main points. This is Minority Report No. 1, however. The following is in regard to majority recommendations 1 and 3 dealing with organization of medical services and group payment for medical services:

"The convictions of this minority are so divergent from those of the majority that they must be discussed in detail."

That discussion takes up a considerable part of the minority report No. 1. I wish I had time to read it all to you because it goes into the two fundamentals of medical practice.

From Minority Report No. 2 which has been given by two dentists, the only two practicing dentists on this committee, I will read an opening sentence or two to give you the general idea of their conclusions:

"The undersigned are in accord with the main position of the majority of the committee in that we recognize existing professional and social trends in medical care as brought out by the committee's studies, and believe that these trends necessitate substantial changes in the manner in which medical service is rendered and paid for."

This is an implied indictment of our own profession by these two members. There is no question in our minds about our inability to serve all the people adequately and I might say that we are willing to take the consequences of our rather plain statement as two individuals, for no pressure was brought to bear on us in making this statement.

Another conclusion of these two committeemen is this:

"Nothing, in our opinion, would be more detrimental, not only to the medical service of the public but to the welfare of the profcssions than an attitude of opposition or mere aloofness on the part of the professions."

I don't care who instituted this committee; I know it was instituted. I know it spent five years in study. I know that during that time there may have been different pressures brought to bear on different members of the committee; I am making no insinuations, but I say it may have happened. I know there might be a chance for some criticism of some of the studies. There is no question in my mind but that some of them are part truths only; however, they are in the form of conclusions and are before the American public today. What are we as professions going to do about it?

The American public, as Dr. Vincent, a former President of our University, once said, gets what it wants. Radical changes might come through propaganda from two or more people who have ideas. Whether these ideas are pointed in the right or wrong direction, the public gets what it is after. If you and I can be classed among the fifteen per cent of intellectuals of this country, it seems to me that, with this document before the American public, and with our own admission in the majority and minority reports that there is something wrong with our dispensation of medical care, we should be able, in a measure, to place before this American public a plan which will not lower the standards of medical service but which will give to more people than it has ever been given before, in a way that no layman can possibly give it, the things medically which they are in need of.

The question is not whether we are getting enough money for our service; it is whether we are giving service to the people that should receive it and what kind of service we are giving.

To reiterate, if we do nothing else, let us have a program which will fit in with the economics and social life of this country. It is not as simple as we might think. Medical care brings in every phase of the social structure. We cannot get away from that. It is not an easy thing to make a program. I am not an economist, and I am not going to tell you what kind of a program to make, but I say we have brains in these professions, and it is now time to use them.

While I cannot hope to go into this subject in a scientific way, my plea is what I have just made, a coöperation in the professions which will make a comprehensive plan, in lieu of the conclusions that are before the American public at the present time, for adequate medical care.

THE MINORITY REPORT OF THE COMMITTEE ON THE COSTS OF MEDICAL CARE*

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I HAVE the highest regard for the opinions that have been expressed to you here by the two speakers who have preceded me, and I have the highest regard for the speakers themselves, but in so far as what they have said has been intended to apply to medical practice, I find myself in agreement with almost nothing that they have said. It is my purpose to base my discussion on their remarks.

Reference has been made to a crisis supposed to exist in medicine, and to the economic crisis. There have been crises in medicine ever since medicine came into being. There have been recurring economic crises, all of which have, in my opinion, developed because of an almost absolute disregard for fundamental principles, biological principles, economic principles, and ethical principles.

The crises that have arisen from time to time in the field of medicine have many times, if not always, been largely due to conditions that have been artificially created, over which medicine had no control.

The Committee on the Costs of Medical Care, in my humble opinion, has to a certain extent done just what was done by the leaders of finance and industry and government and philanthropy in producing the saddest economic, or rather uneconomic, situation that has ever existed in the history of the world. The Committee has largely ignored, in my humble opinion, fundamental biologic, economic and ethical principles. It is my hope that the medical profession will not fall into the same error and ignore the fundamental considerations that must be basically considered in the provision of any plan intended to be useful and for the service of humankind.

Reference has been made to certain "facts" in the majority report of the Committee on the Costs of Medical Care. There are certain facts in the report; there are certain half facts in the report, and there are certain so-called facts in the report that never were facts. Some of the so-called studies that were made by the Committee, on which its report was supposed to have been based, were really only partial studies that applied to a minute part of a great picture. They did not cover the whole picture, as it will be necessary to do before any of the fundamental considerations involved can possibly be properly settled.

Dr. Rudolph has told you that certain of these studies are subject to criticism, and I heartily agree. For instance, the report is supposed to be based, in parts, on a so-called investigation of industrial medical service. The fact is that the committee's investigators studied three industrial medical services in the United States, *the* three in the United States, perhaps, which lent themselves most to favorable comment, and did not study a single one of the inferior industrial medical services of this country that are pernicious, always have been and always will be pernicious as long as they are carried out on their present basis of operation. The result is that the majority report of the committee does not point out the dangers that are inherent in certain forms of medical practice that are not designed to serve the best interests of scientific medicine, or, what is of more importance, the best interests of the public.

An investigation was made for the Committee by a Ph.D. to evaluate the medical service of an individual state. The investigator had no medical experience. This so-called study was made in one of the oldest states in the Union, with a capable medical profession that has served the people of the communities of that commonwealth for more than one hundred years and has given them good and efficient service. The Ph.D. who evaluated the medical service in this state, apparently because he did not find every doctor in it with a blood metabolism apparatus under one arm and a microscope under the other,

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reported, in effect, that the medical service of that state was unsatisfactory, inefficient and incompetent.

I stand here today, as I will stand anywhere else, and say that that was a cruel misrepresentation of fact, and that it is a cruel thing for any agency anywhere, at any time, under any pretext, to destroy the confidence of the public of any community in the only medical profession that it has or that it is going to have for a long time, when that profession has made a record of sacrifice and devotion to the cause of humanity such as has been made in that state and has, at the same time, established a fine record for efficient service.

Dr. Fishbein has been gently accused of misrepresenting the facts concerning the origin of the Committee on the Costs of Medical Care. For the information of the speaker and for the information of this audience, I may say that it is my understanding that Dr. Fishbein's statement is based upon the personal communication of the gentleman whose name was mentioned by Prof. Chapin, claiming credit for instigating the movement that brought the Committee on the Costs of Medical Care into being.

It would be interesting to know just how much this gentleman and others like him contributed, in the process of building up fortunes of millions of dollars, toward making it possible for those whose labors made their accumulations possible, to buy and pay for needful service, on the basis of American principles. The majority report harps on the fact that most of the people of the country have incomes so small that they cannot pay for service of the most needful kind, but I cannot recall that one word of protest is offered against that uneconomic situation.

Something has been said about the need of the medical profession being aroused. I stand here to say that the medical profession has always been aroused, and it has never been anything but aroused. From the very time of Hippocrates until the present minute, medicine and the medical profession have been progressive and never static. I defy any group on the face of this earth to produce a record for progress that will surpass the record of scientific medicine. I defy any group to present a record for devoted, unselfish, efficient service that will surpass the record made by the medical profession. Medicine has never been satisfied; it has never stood still. Its knowledge has been developed through the devoted service and through the observing experience of a self-sacrificing, intelligent, devoted profession. The highest ideal of that profession, from the days of Hippocrates until now, has been that the interest of the individual patient and the interest of the public shall be first. Organized medicine adopted that principle in the very beginning and has never departed from it to even the slightest extent. As long as the medical profession is permitted to exist as a profession, you may be sure that it will never depart from that highest ideal.

Something has been said about the need for the medical profession to put its house in order. I agree most heartily with that sentiment. There is need for every house to be put in order. The biggest mess that has been created in the house of medicine, however, has been created by promoters and theorists, amateur and professional, faddists and agitators, amateur and professional, through their preachments to the public. I do not contend that medicine is perfect. I do not contend that the medical profession is perfect for I know it is not. The very simple reason why it is not is that it is made up of human beings. I know just as well as anybody else knows, and a little bit better, that undesirables have succeeded in securing license from the state to practice medicine, but I also know that the organized medical profession has fought them to their death, and that it always will, in an effort to prevent their impositions on the public. Medicine strives to keep its house in order and will continue to do so.

There are many artificial schemes that have been promoted for the provision of medical service, including some of those which have been proposed by the Committee on the Costs of Medical Care. In my humble opinion, the committee did not study the effects of the operation of these schemes any more than it studied the effects of the operation of so-called industrial medical services of an inferior sort.

I have been in position to observe the work of medicine for nearly forty years, and I have had opportunity to observe from many standpoints. I studied medicine, taught in a medical school for sixteen years, practiced medicine for nearly thirteen years, was in the state health service for twelve years. I was the secretary of my state medical association for ten years. I have

been Secretary of the American Medical Association for nearly eleven years. I have belonged and have actively participated in the work of various organizations whose activities touched medicine and its service in one way or another. I was a member of the Committee on the Costs of Medical Care, perhaps a poor one, but nevertheless a member. Incidentally, I was a member of the Commission on Medical Education. It is interesting, by the way, to note that the report of the Commission on Medical Education, which has just been released from the press, studied some of the very things that are supposed to have been covered in the studies of the Committee on the Costs of Medical Care, and comes to conclusions that are exactly opposed to those of the majority group of the Committee on the Costs of Medical Care. The Commission on Medical Education opposes the socialization of medicine. It opposes the schemes that are proposed by the majority report of the Committee on the Costs of Medical Care. It is interesting to note, also, in passing, that two members of the Committee on the Costs of Medical Care who signed the majority report are also members of the Commission on Medical Education, which brings in exactly opposite findings. These two gentlemen, in so far as I am informed, registered no complaint against the findings of the Commission. Just how they can justify themselves in that situation, I do not know.

As I say, my observation of these artificial schemes has been extensive. I will tell you how some of them work as I have seen them in operation. They work by promising a great deal and delivering comparatively little. Pretending to reduce the cost of medical care, the first thing they do in many instances is to send out agents who sell their "services" and receive commissions varying from twenty-five to fifty per cent on their sales. So, before they ever get started, anywhere from twenty-five to fifty per cent of the funds that are supposed to be realized immediately have been dissipated in paying the commissions of solicitors. The cost of medical care for the general run of the people will not be reduced through any such process as that.

Another thing that happens under the operation of these artificial schemes is that whenever one of them succeeds financially, even to a slight degree (and when they do not succeed financially they just fade away like snow before the sun), it almost invariably stimulates the development of other somewhat similar schemes which invariably offer more for less, with the result that the medical profession is pauperized and the quality of medical service is constantly deteriorated.

What the minority group of the Committee on the Costs of Medical Care stands for is to prevent the deterioration of medical service, to preserve professionalism, which must be preserved if humanity is to have the benefit of the proper application of scientific medical knowledge. Is there anybody who believes that professionalism (which is a poor word to express what I have in mind but is the only one that comes to mind) will be permitted to continue under political domination or under the domination of those who know nothing whatever about what is actually involved in the delivery of medical service?

Taxation! What did you ever know of that was supported by taxation that was not politically dominated? There is only one instrumentality through which the facts of scientific knowledge can be applied for the benefit of humankind, and that is a qualified, free medical profession. Whatever tends to destroy professionalism in medicine tends to bring disaster to the people who need its service. I know that some will say that is opinion, and it is, but it is opinion based on nearly forty years of observations from a vantage point right in the middle of things as they have gone on day after day.

This depression we are in is an artificial situation just as the great wave of so-called prosperity was an artificiality. There isn't a man in this room who did not know long before this depression hit that it was bound to hit. There was no escape from it, because business, finance, government and philanthropy made the conditions that made it inevitable by their disregard for the simple fundamental laws of economics. I don't know where the sociologists and the economists were in 1928 and 1929 that they did not tell us about what a terrible fix we were going into.

There are many things in our social fabric that are artificial. The fundamental questions of human welfare are never going to be properly solved until many of these artificialities have disappeared. One of them is that monstrosity

that we know as the modern city. The influences that have come out of the modern city have made many of the phases of this crisis in medicine you hear about.

Something has been said about the lag in the application of medical science. I thank God there is a lag. If there were not a lag in the application of medical science until we could determine what science really is and is not, there would be many more graves in our cemeteries, and our highways would be thronged with the lame and the halt.

Something has been said about the wonders of our educational system, and it is wonderful. But, in my humble opinion, there are certain influences that have come out of the educational system as it exists today, that have played a very considerable part in producing the crisis that has developed in the life of this nation. I say again I am expressing only my personal opinions that with me are convictions; if there is anything more to convictions than there is to opinions, I should like to get credit for that. An attempt has been made, and has succeded in a certain sense, to make the schools serve the purpose of the home. There is no institution, school, church or club, that can properly perform the function of the home. In the same way there never will be an institution that will successfully bring good medical service to the people, except the institution of medicine, and that can not do it unless it is left free from political domination and unqualified lay dictation.

Something has been said about blind effort. The medical profession may be blind, but from the very beginning until the present moment the medical profession has been engaged in persistent effort to make it possible for all mankind the world over to receive the benefits of the scientific knowledge that it has developed. The knowledge of scientific medicine has been handed down generation after generation, from physician to physician, and from physician to the world of physicians, with the admonition that it must be used for the benefit of the individual man and for the benefit of men collectively. In my humble opinion, again, not to say conviction, the job has been pretty well done, blind or not.

Something has also been said about the individual aspect of the medical practice. If our sociologists, economists and philanthropists could all be made to practice medicine for about five years, and if our doctors could all be made to study fundamental economics for about five years, I think we would come to an agreement, and the agreement would stand for the very things that the medical profession stands for now. There is no possibility of providing good medical service except on an individual basis. Machine methods, mass production methods may be applied with some measure of success of a certain kind when all human beings have been standardized to react exactly alike to all stresses and strains, to react exactly alike to all medicinal agents that may have to be applied, to react exactly alike to all mental stimuli and physical stimuli. When that time comes I hope you and I will not be here to see the mess that will exist in the world. It is written in the Holy Book that the meek shall inherit the earth, but, in my opinion, it will be a hell of an earth when everybody is meek and when everybody is alike.

It just so happens that when time began, certain immutable biologic laws began to work. They are working now though some of us are trying to upset them, and they will work until time is no more. There will never be any method through which the benefits of scientific medical knowledge can be successfully applied for the relief of mankind and for the improvement of mankind, except through methods that have an absolute regard for those unchangeable laws of nature and that recognize that an individual is an individual. What is good for Dr. Johnson is worth nothing for Dr. Braasch; even though they weighed the same and looked alike, which God forbid, thought alike, ate alike and *were* alike so far as you could tell by looking at them. There is still inside of each one of them something which, for want of a better word, we must designate as a soul. Medicine has to deal with that, whatever it is, that we call a soul, and medicine can never succeed in its high purposes except as consideration is given to the individual soul in the individual man. There is more to it than pouring them in and grinding them out, which is the system of socialization.

Something has been said here about the wonderful improvement that has been effected in certain phases of medical practice in Great Britain. Oh, yes, I have no doubt there is an improvement. An improvement over what? An improvement over a situation that was absolutely impossible because the people that are now

served by the so-called panel practice system were served first by voluntary insurance groups that worked just like all voluntary insurance groups work, to the disaster of the public. The present panel system may be an improvement over what preceded it, but it has in it the same inherent possibilities that the other system had.

A very distinguished gentlemen who is, apparently, a proponent of panel practice, recently told me of some of his observations in England, where he went over a large part the country to look into the actual conditions of panel practice. He found a friend who graduated in his class in medicine, who went to England to finish his post-graduate work and decided to stay there. He is now a panel physician. They went together to the doctor's surgery, where they were confronted by a large group of panel patients. The doctor said, "All of you who are coughing, stand up!" All that were coughing were brought into his office, given instructions without examination and sent out. After winnowing them out on the basis of the outstanding symptoms presenting, there were two or three left over who were really sick. These were given a half-hearted examination and were then sent to the hospital, where they had to be waited on by competent physicians who did not get one cent for their services. That is how socialized medicine works. It destroys scientific ambition. It destroys scientific initiative. It destroys professionalism in medicine, and tends to destroy the only instrumentality through which its benefits can be effectively brought to the service of mankind.

A distinguished British physician made a wonderfully amusing remark to me when he said, "West, I am getting a little uneasy because I think I can see that it may be possible the slimy hand of politics will inject itself into this panel practice scheme." Well, the slimy hand of politics will very likely inject itself into any situation that is operated under political control.

Emphasis has been laid on the fact that the majority report of the Committee on the Costs of Medical Care insists on the maintenance of the intimate, personal relation between physician and patient. That is fundamental in the successful practice of medicine, from the standpoints of patient and physician. But the personal relation that is so basic to the needs of the individual who seeks medical service can not be maintained through any scheme whereby the medical profession is socialized, or whereby the patient is made subject to methods of machine operation, as would certainly be the result of the adoption of the plans proposed in the majority report.

The plan of group purchase is not as free from faults as the majority report would have you believe. Many times the group purchase scheme is pernicious to an extreme degree. It is not fair, to say the least of it, to hold the plan out to the people as one that is in any sense ideal. Group purchase is no new thing. It has not been generally accepted by the profession, as it would have been long ago had its weaknesses and its blighting effect on scientific initiative, scientific ambition, and professional independence not been well understood by physicians. And that means that physicians have thoroughly appreciated the evil effects on the public welfare, of machine methods, and have kept constantly in mind the fact that under the ideals and traditions of medicine the interest of the patient and of the public comes first.

I believe in "organized charity," which has been referred to here, but I don't believe there is any great magic in the name "organization." I dare say there isn't a physician in this audience, who, in spite of the operations of organized charity, has not had to go right down in his own pockets time and time again and pay for the basic needs of patients who had called for his services. Organized charity is very weak in many places, because it has had far too much of the mass-production, machine principle injected.

Of all the groups that would be most ruined by the machine principle, the medical profession is *the* group. How can you maintain the free choice of physician, which is the right of the patient, if you are going to mechanize and socialize the medical profession? It cannot be done.

Voluntary insurance has always been the forerunner of compulsory insurance. Don't forget that. In every country, insofar as my knowledge goes, and I have studied the thing some, voluntary insurance has preceded the installation of a system of compulsory insurance. If you will read the majority report of the Committee on the Costs of Medical Care carefully, and if you had read the book which preceded the work of this Committee, written by its director, you will be-

come quickly convinced that compulsory insurance is the thing that is eventually aimed at.

It would be easy to provoke considerable argument over the discovery of anesthesia, referred to by one of the speakers here today. If you go down to Georgia and say that Morton discovered anesthesia, you will have cause to regret it because they believe down there that Long did it, and will produce documentary evidence to prove it. If we are going to direct medical affairs, let us know medicine.

The greatest fallacy that has ever been preached is that you must not criticize anything unless you substitute something for it. I do not believe there needs to be anything substituted for the institution of medicine. There are certain inequities that ought to be removed from the situation. Medicine ought to strive, as it has always done, to make its services available to every human being that is in need of medical service. Medical organization ought to strive to perfect itself as it has always done so that its service and the services of physicians as individuals and collectively can be rendered to better advantage in behalf of all mankind. I am proud to say that has been the constant aim of medical organization and that it will persist in its efforts to that end.

Dr. Rudolph, with whom I had the pleasure and privilege of serving on the Committee on the Costs of Medical Care, two or three times said something to the effect that he did not know how much stress or how much pressure had been brought upon members of the committee. Well, I was on it for about five years. I never had a human being on the face of the earth, anywhere, at any time, even suggest to me what I should think or do as a member of the Committee on the Costs of Medical Care. My actions as a member of that committee are my own actions. I am responsible for them, and they are based on the convictions I have tried to express here today.

I would admonish the physicians of this country to scrutinize with the most extreme care any plan involving the delivery of medical service that may be presented to them with a view to their participation.

If a plan can be brought forward that will fit into the social fabric, that will not destroy institutions that are essential for serving the deepest needs of humanity, let us get in and help promote it and perfect it and carry it on, but let us be sure that those conditions are met.

I stand for the principle that if any new plans for providing medical service are to be put into operation, they should be controlled by the medical profession, which is the only group qualified to know what is good and what is not good. Certain plans have been put into operation by medical societies. They have found, in most instances, that to make them go they have had to resort to the same purely commercialistic practices which have been used by purely commercialistic groups that have promoted similar plans in their own communities.

My final word would be to say to you to help, help in every way that is possible, in accordance with the highest traditions of medicine, than which there are none higher, and in accordance with ethical principles, and in accordance with sound economic principles, and in accordance with the laws of nature itself. Help promote everything that will advance scientific medicine and will make its benefits easily available for every human being everywhere. But be sure that you do not promote some artificial scheme that in the end is going to produce exactly the opposite effect.

SOME PRINCIPLES INVOLVED IN HEALTH INSURANCE*

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SO much has been said and written recently pertaining to the economics of medical practice that one is bewildered. It is therefore proper that our national and state societies should encourage and create opportunities for discussion of these important problems. Each state society through its executive officers must be

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prepared to give advice and counsel to the component societies and their members, which means that our officers and our councillors must acquaint themselves with the current tendencies in medical practice and the outside influences that are acting upon them. At the present time this is no small matter for it is not at all easy to view clearly the present situation. We must evaluate our methods of practice and support all that is proven by time to be good in them but we must consider without prejudice suggestions and recommendations for changes. Nobody is more fit to judge as to the type of medical practice that will be best for the people than the medical profession and we must not permit outsiders to manage our affairs. Organized medicine must see to it that we are not stampeded into some unsound scheme. In times of economic distress such as these our members suffer as acutely as any other group and may be enticed into entanglements of various kinds of contract and insurance practice that are not sound that will cost the people and the profession dearly in the long run. There are certain sparsely settled, industrial localities where some form of contract practice is for the best of all concerned and under certain existing conditions has the sanction of organized medicine. The fact is that, after all, these various schemes cannot work without the coöperation of the medical profession. If organized medicine, whose ranks are composed of the best in our profession, refuses to support any given system of practice it cannot be carried out. It may start but its end is certain when only the least qualified by nature, inclination, and training are to carry it on.

We must stand together. In the larger cities and centers we unfortunately must acknowledge that many of our leaders in scientific medicine have been but casually, and often only selfishly, interested in organized medicine. They have assumed an irresponsible and a critical attitude. But even they are beginning to realize that such wide sweeping reforms as are recommended in the majority report of the Committee on the Costs of Medical Care will affect every one in the profession. All must give their support in combating the recommendations that are inimical to sound practice or the trend toward socialization may bring their house tumbling about their heads.

Perhaps we are unduly alarmed but a little honest fear as to consequences leads to preparation to prevent trouble. We have cause for worry and it behooves us to do some thinking along the lines of economic affairs, not only as they concern our own profession but along broader lines. We must play our part as interested citizens and protest in no uncertain terms against the encroachment of national government into private business and urge that it about face and tend to its duty of furnishing us, as it was originally intended to do, the political liberty to carry on in an independent untrammeled way our jobs in a manner in accordance with the traditions of the American people. If our government holds to its present direction and the rate of speed it will defeat the very object of its birth.

Before such a gathering as this it is unnecessary for me to go over ground already so well covered by speakers much better qualified than I am. This meeting of our State Society is in reality a call to awaken interest. We have men in our national and state associations studying the problems that confront us and we must acquaint ourselves with their teachings. If those teachings are not sound I have not the least fear that they will prevail for our profession will not accede to anything that smacks of selfishness. The interest of the patient always comes first and fortunately what is best for him is also best for us.

The probabilities are that the present widespread economic crisis will cause more attention to be paid to the fundamentals causing the distress which well meaning socially inclined people thought was caused by the so-called high cost of medical care. Let us hope that they will see the light and investigate the cause and not the effect.

The time has come for us to consider the question of health insurance, not in the abstract but in the concrete. Various plans are making their appearance in our midst. We have numerous examples abroad to study but of all, the British should receive our most careful consideration. Our political and social life is tinged with the British imprint more than any other, our traditions and ideals are similar.

We should ask ourselves first whether we are in favor of any plan of health insurance. Undoubtedly the immediate reaction of the average physician in this country to such a question has been up to the present a prompt denial not unheated in its nature. The question, however, must have careful consideration and a thoughtful

answer. Merely because we do not want bureaucratic medicine does not mean that some form of health insurance cannot be worked out. The lack of foresight and often inability of people to provide against the unexpected expense of illness with all the sacrifices and heartaches that ensue is known only too well by physicians. They are whole heartedly in sympathy with any sound plan that will provide against this unpreparedness. There are two distinct groups of people concerned, those who could but do not budget in some manner against the cost of illness or accident, and those who are forced to live so close to the margin of their slender incomes for the very necessities of life that such provision is well nigh impossible. When illness strikes the latter they form the group spoken of as the indigent sick and should be separately considered. The medical profession realizes that it is quite probable that before long some form of health insurance will be offered on a large scale by our insurance companies, who have been closely studying the problem for some time. The numerous examples of this type of insurance in European countries have furnished splendid experiments and sufficient time has elapsed to prove or disprove the value of such attempts. It should be our hope and endeavor that in America, where individualism is still in favor, health insurance free of governmental control can be carried on. We must conclude from a purely theoretical and logical line of reasoning, putting aside the complexities that arise from the human side, that health insurance is just as desirable as life insurance or accident insurance. The great difficulty, and the one that has held back the development of health insurance by our large financial companies, is the uncertainty as to when the individual has, so to speak, lost his health and when he is able to return to work. In life insurance payment is made on death. In accident insurance payment is made on evidence of proof of injury by accident. In the latter difficulties arise when the severity of the degree of injury is to be determined and the length of time it takes the insured to recover and go back to work. The comparatively few number of accident cases and the more or less definite nature of the injury and duration of disability have made it possible for this type of insurance to work out more or less satisfactorily. It does not take much of a flight of imagination, however, to conjure up the many difficulties that are to be encountered when health insurance on a large scale is in force. In the countries in which it is in force it is freely admitted that the health of the people is certainly no better and that the incidence of sickness has increased by leaps and bounds, particularly around holiday seasons. Human nature with all its weaknesses and absurdities is the same the world over and is an intangible and most uncertain quality to deal with and throws askew statistical estimations of the incidence of sickness and the length of disability based upon figures obtained from a population not living under health insurance.

If a plan of health insurance is developed what is to be the relation of the doctor to it? For the best interest of the patient his relationship to the doctor must be the same as it always has been. The destruction of this relationship has been the rock upon which contract practice has always split. The doctor must be free and untrammeled in his treatment. Granting that certain abuses arise under our present system, nevertheless, the abuses are many times greater when lay control exists and these abuses always act to the detriment of the patient. The medical treatment should be completely under the control of the profession. The fees for medical service should be separate and distinct from the cash benefits to the patient for his time lost due to sickness, disablement and invalidity. Just how the physician is to receive his compensation is a matter to be determined. Putting upon the doctor the responsibility of saying how long disability benefits shall last is unfair to the practitioner and is a constant source of irritation under the various systems in existence. Our duty is to get our patient as nearly well as we can and our sympathies are naturally with him. If we deny him disability claims we lose him and his family. We must accept our share of this difficult problem but the lion's share should not be ours.

There are many questions of this kind that we might consider, but time is short and I am merely touching upon these few points as suggesting to you the difficulties that arise when this question of health insurance is considered.

WHAT IS GUILD MEDICINE?*

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LADIES and Gentlemen: You know I am one of those Ph.D.'s at whom roses have been thrown in the course of the afternoon. Now I have three slight defenses which I will offer for my position. In the first place, it happened to me when I was very young. In the second place, I have had the fortune of being with medical men continuously for a period now of twenty-eight years. In the third place, I think you will see that some of the views I have to present agree with the opinions of certain medical men here today.

I should like to attempt to present my ideas this evening in part graphically, and to start my graphic presentation in this fashion: We very often think of the present controversy as a discussion of two radically opposed forces, of the individual in medicine (and now I am speaking from the strictly economic and not the professional point of view) as against the state. We may picture this concept as shown in Figure 1-A. Here two centers or foci of interest are indicated. One is the individual and one is the state, and between the two is the stress line with regard to the practice of medicine; and it is pull devil, pull baker, as to which center will occupy the commanding position.

I would rather look at the situation in this fashion: I would rather think of three centers of medical policy or interest, and I would diagram my concept in this way (Fig. 1-B). In this diagram I place *three* centers, representing three different forces in medicine and in theories of medical care, somewhat bound together.

The first center would be the one that is ordinarily called individual or private medicine. I am inclined to take the position that, economically speaking, there has been little, if any, strictly individual medicine for over a century. The battle with respect to strictly economic individual medicine was settled in England and France about the middle of the Eighteenth Century. So I will call this center not individual medicine but guild medicine.

How does guild operation differ from the operation of an individual? Very strikingly. Let

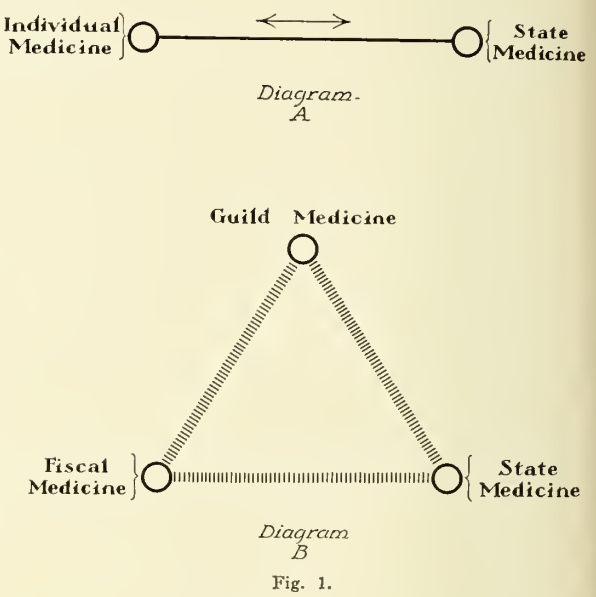


Fig. 1.

us note a few of their differences. A physician does not advertise. An individual in private competitive business advertises freely; it is honorific; it is a recognized form of competition; and few raise their voices against it. As a matter of fact, the individual in business is often complimented for his acuity in the type of advertising he employs. If medicine were an individual instead of a guild relationship, there would be any amount of advertising that the individual cared to do.

Second, in a guild the arts and technics employed are free to all members of that guild. This condition certainly applies in medicine. If a surgeon discovers a method or technic of an operation, does he conceal it? He does not. He publishes it. He gives it to his colleagues, he trains them in its use. If an internist, we will say, develops a better method of administration of insulin, does he conceal it as a trade secret? Not if he does not wish to be ostracized. He publishes it. He communicates it to his col-

*Presented at the Conference to discuss the Majority Report of the Committee on the Costs of Medical Care, under the auspices of the Minnesota State Medical Association, Minneapolis, December 18, 1932.

leagues. It is immediately made free to the profession. If a better method of controlling thyroid diseases is devised, it is equally made free. Yet in private or individual enterprise the patenting of processes is a highly legitimate procedure. In fact, it is specifically provided for in the first article of the Constitution of the United States. We pay some five and a half million dollars a year to maintain a Patent Office, so that individuals may hold the right of their specific discoveries over long periods. Here is an utter difference in economic attitude of the guild from that of the individual.

The guild does not hesitate to train younger members, but an individual in private enterprise may and frequently does very carefully protect his technological processes, particularly in very elaborate chemical practices. He very frequently hires people who are concerned with only certain steps in those processes, while he guards other stages from their knowledge. This is recognized as an honorable procedure.

A physician who is a member of the guild and lives by its precepts is very careful of the ethics of receiving patients formerly under the care of another physician. He inquires in detail whether some other doctor is engaged by the patient before he offers his services. Thus, according to the ethics of his guild he limits his competition by a definite code of conduct. Yet in individual enterprise it is usually recognized that "competition is the life of trade" and that this competition is entirely respectable and proper so long as it remains within the limits of the law.

So you see that from an economic point of view the guild is entirely a different thing from the individual. The real fight in which the guild maintained its original structure occurred about 150 years ago. At that time many physicians made their own prescriptions, kept them entirely secreted in their prescription books, and regarded them as personal property.

The guild in medicine was part of medieval society, and it is centuries old, so that our distinguished presiding officer is really a spiritual descendant of the master of the long robe who 500 years ago presided over a guild.

Why is it that the guild form has remained in medicine while it has disappeared from most other forms of human activity? Remember that 500 years ago most human affairs, when conducted in communities, were organized in the form of guilds. Today medicine and the related subjects are perhaps the only forms of human activity that are organized in guilds or, as we call them, organized professions.

What has made it possible to carry the guild through this period of some five centuries? Let us think of some of the epochal changes in society that it survived. It passed through the Reformation, and in England the Dissolution. It passed through the commercial revolution of about 1600. It passed through the industrial revolution which occurred from 1750 to about 1830. Yet throughout these changes it kept much of its original form.

I take issue with my distinguished colleague of this afternoon, who apparently thinks of the guild form as being something which is rather outworn, and that we are now facing a crisis that is different or greater than any crises that society has met before. The crisis which we face today is great; but is it, for example, greater than the crisis that we call the Reformation? Consider a period in which a country like Germany was decimated by civil war over a period of twenty years. Consider a period at the same time when a country like England saw the forcible changing of hands of perhaps one-fourth of the entire property in five years. The guild lived through this. Consider again the industrial revolution, which fairly roared through Europe. There is hardly a social structure remaining to us which was not profoundly modified by the industrial revolution. But medicine has gone on in the guild form.

Can this have happened simply through the force of tradition? If so, why did not tradition protect other guilds? My own surmise is that the guild of medicine has lived for two rather vital reasons. The first and by far the more important of these is that the members of the guild have an essentially personal relationship with their clients. This close relationship rarely exists elsewhere, except possibly in certain relationships of the church. This idea of the importance of the personal relationship was inherent in the society in which the guild of medicine took its origin.*

A great many physicians drop in to see me in

*"Dr. Cunningham draws attention to the fact that the existence of such a universally received code of economic morality was largely due to the comparative simplicity of the mediaeval social structure, where the *relations of persons* were all important, in comparison with the modern order, where the *exchange of things* is the dominant factor."—George O'Brien, *An Essay on Mediaeval Economic Teaching*, 1920, Chapter 1, page 10.

my office, and I have made point in recent months of asking them, "How much of your work is technical, and how much of it is acting in the capacity of advisor or counselor or confessor?" The figures for the latter function generally run from about 25 to 45 per cent. So I think that the fundamental, personal, psychological relation is one chief factor that has kept the guild alive.

The second element which seems to me to have been vital to the guild is the fact that each medical problem is a biological problem and therefore does not permit the codification and pricing that is characteristic of modern business procedure. Doctors are sometimes criticized because they will not at the beginning of a disease or preceding an operation set a fixed fee. I have a friend who deals in coal, who made such a criticism the other day. I said, "What would be your position if you dealt with coal in an expansible wagon which might contain five tons by the time it arrived at the consumer's door or might contain half a ton?" Each medical problem is a biological one, and there can be no precise estimate of its complexity until after the problem is solved.

Let us consider briefly what a guild tried to do and how far the profession of medicine follows this process. A medieval guild really had three main functions. The first function that it performed was to protect its members from being exploited by each other, and to protect the guild as a whole from being exploited by non-conscientious persons on the outside. Certainly, medicine has been able to carry out this function, humanly speaking, very well. It is carrying out this function when it builds up taboos against advertising and other similar procedures.

The second thing that the guild did was to improve its services. Every medieval guild made this attempt. I have given an instance on occasion. For example, a brewer in medieval days was a member of the brewers' guild. If he made bad beer, the master brewer was compelled to drink one quart of the beverage and then was soused in the hogshead.

Does not medicine improve its services? It seems to me that medicine is also carrying out the second function of a guild as well, humanly speaking, as an organization can. As we all know, the information is exchanged, young men are trained, professional advances in technic are not kept secret. The relation of patients with respect to the practitioner is maintained.

The third function that a guild performed was the rigid control of its membership. If any place, this is the place where medicine, it seems to me, has failed as a guild. Not that it does not examine its members when they enter; but even before the process of education of physicians passed largely to endowed or state institutions, the membership had really commenced to grow beyond the necessities of society and the necessities of the guild.

In this country, part of this situation is probably associated with the general shift in employment. In the year 1820, roundly 3 per cent of the gainfully employed in the United States were engaged in professional services. One hundred years later, in 1920, approximately 5 per cent were engaged in professional services. Thus there had been a gain of 2 per cent of the working population in professional services over a period of one hundred years. In the year 1930 approximately 7 per cent of the gainfully employed were engaged in professional services, not necessarily medical but some form of professional services. In other words, the relative change has been as great in the last decade as it was in the whole hundred-year period between 1820 and 1920.

This seems to be reflected in the character of our education. In the last ten years the number of persons entering college has increased about 100 per cent. The number of individuals entering secondary schools has increased about 10 per cent, and the number of children entering primary schools has increased about 3.5 per cent. The proportion of these college students who plan to enter a profession seems to be steadily mounting. So we are facing, in the over-crowding of medicine, a movement which is taking place in all professional activities.

I have labeled the first center in my diagram "guild medicine." Some other name should be used for the other two centers. For want of a better term, I shall give to one the name "fiscal medicine"—and I use the term "fiscal medicine" in the sense of medicine which is conducted with an intermediary, or a person engaged in finance, between the physician and the patient, that is someone who controls the situation from a financial point of view. And I shall label the third "state" or "social medicine."

Let us consider briefly the status of fiscal medicine. It has already been discussed several times

today. I should like to point out, however, one or two characteristics regarding it which I think may be of interest to you. Is fiscal medicine, medicine on a business basis in which the business man runs it, going to be a success? Mr. Filene, whose name has been mentioned several times today, thinks so. I have just finished reading a paper in which he roundly berates the doctors because of their lack of ability to place their functions on a business basis. His remarks are as follows:

"Today we are witnessing the paradox of a nation starving for medical care, while ample facilities for this care are at hand. This touches a more personal point: the doctor's pocketbook. It is not unreasonable to say that doctors work as hard as any class of business men. Why do we find, then, that the average physician's income is barely in excess of $5,000, although seven years of intensive study and a capital investment of, say, $20,000 is required to enter the medical profession?

"In our scientific research we are quite abreast of other countries. Our hospitals are well staffed. With an A-1 product to sell—HEALTH—this slackness of sales shows only one thing: absence of proper organization within the medical industry."*

Mr. Filene is a retail merchant. I have often passed his store on Washington Street in Boston. I would feel much more enlightened if Mr. Filene would tell us how he is able by business methods to supply with footwear the mass of people needing shoes, but without funds, who trudge past his store in the slush of Washington Street.

One of the greatest weaknesses in fiscal medicine is this: Most fiscal medicine is placed on a voluntary insurance basis. There are in this country between sixty and eighty great insurance companies, as well as a large number of smaller ones. They form one of our best organized and most intelligent forms of corporate activity. The oldest of these companies has been soliciting business for over one hundred years. If there is any device, any appeal to one's pride, cupidity, prudence, or any other quality of human nature which has not been played upon by an insurance solicitor, I have yet to hear of it.

Most of this insurance has been for what purpose? It has been for protecting against the one great certainty—death. But illness is not a certainty; it is a possibility or, at most, a probability. How successful have these great and well-organized corporations proved in covering this risk of a certainty? It is said that one-eighth of the insurable people in the United States are insured today, and one-eleventh of the insurable people in the state of Minnesota are insured today. Roughly speaking, then, all of these devices for voluntary insurance seem to work down to covering about one-tenth of the population. They provide protection for the provident.

This lack of spread of insurance against misfortune might be avoided by making insurance for medical care *compulsory* instead of voluntary, and this program has been suggested. However, it is hard for a layman to distinguish between compulsory insurance and taxation. *De facto* such a contribution *is* taxation, although I am assured by good legal authority that *de jure* it would be regarded as exercise of police power. I will consider sickness protection by taxation in another point of this paper.

The second point I would make in connection with fiscal medicine is this: Fiscal medicine, in the sense I am using it, means that the financial control of medical practice will lie in the hands of somebody else than the doctor. It is my general observation, as a realist, that he who holds the pursestrings holds the power; and while, if the doctor and the entrepreneur were engaged in combat, my sympathies would be all with the doctor, were I to place a wager, it would be on the entrepreneur.

These two great weaknesses, then, seem to lie in fiscal medicine. As a matter of fact, the general experience has been that the occupation of protection against disease, when it moves away from the guild form, goes first to some fiscal form and then moves to some state form. This process happened in England. When the Lloyd George Medical Bill was passed, few if any more people were protected at first than had been protected under the Friendly Societies which had previously existed. This group was taken over and later greatly increased. This was really a movement, I would say, out of the fire into the frying pan.

Let us regard the third possibility, or state medicine. A great deal has been written about the characteristics of state medicine. I shall not attempt to go over these with you. They have been described to you at some length.

I would point out that, quite aside from the character of state medicine, there exist certain

*From "A Merchant Looks at Medicine," *Medical Economics*, November, 1932, 10:17-18.

economic phases of the subject, and I would like to diagram them for you. According to the Committee on the Costs of Medical Care these costs to an individual may be estimated as somewhere between $20 and $40 a year. Let us take the same order as pensions or the same order as war debt charges and payments, or considerably more than the cost of our entire military establishment, army and navy, or approximately two-thirds of all the rest of the government costs together.

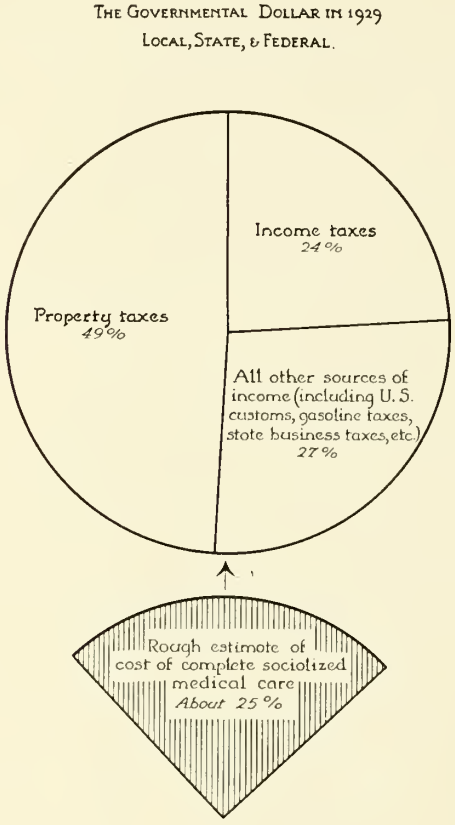


Fig. 2

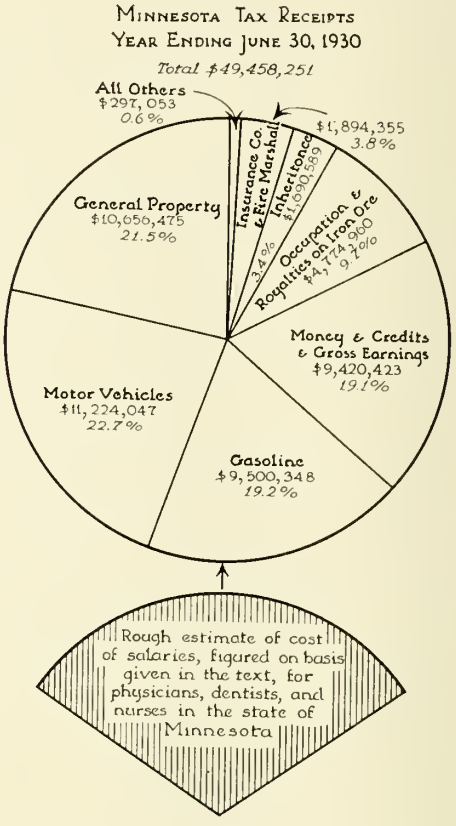


Fig. 3

median figure of $30, which seems to be fair. All forms of government in the United States are said to collect in the form of taxes about $116 per person. Then roughly, 25 per cent of the now estimated tax collections of the country would be required for operating social medicine if carried to everyone on the basis of the median figure of the cost of medical care.

With this in mind, let us examine the expenditure of the federal tax. About 27 per cent goes to pensions. About 29 per cent goes to interest and payment of principal on our war debt. Somewhere in the neighborhood of 16 per cent goes to maintenance of our military establishment. The remaining sum goes to support all other functions of the federal government. If, then, we think in terms of the federal government expenditure, we must estimate the cost of complete state medicine as requiring a sum of about the

Let us look for a moment at where the federal and *all other governmental divisions of the country* get their dollar (Fig. 2). Approximately 49 per cent of the dollar comes from all property taxes. Approximately 24 per cent is derived from the income tax, and about 27 per cent comes from all other sources, including customs, gasoline taxes and a number of other items. So if you wish to consider medical costs in these terms, you must think of complete socialized care as costing a sum equal to about half of the property taxes of this country or to about the total sum of income taxes, or nearly all other sources of income except property or income tax.

Let me turn a little closer to home. Let us think about our own state (Fig. 3). Minnesota has a population of about 2,500,000 people. It is probably fair to say that under such a system as advocated, there would certainly be 40 per cent of

our population that would be eligible to socialized medical care. Forty per cent of 2,500,000 people is 1,000,000 people. Twenty dollars per person is $20,000,000, which is somewhat over one-half of our proposed taxes for this state for the next year and somewhat over one-fifth of the receipts of all state funds for the fiscal year ending June 30, 1930.*

If you care to examine the problem another way, let us look at it in terms of the persons who are now engaged in medical care in this state. There are upwards of 3,000 doctors. Certainly we should not pay our doctor less than $2,000 per year. That would be $6,000,000 for the 3,000 physicians. I will leave out the 1,000 cultists for the time being, but there are about 2,500 dentists and they certainly ought to be paid at least $2,000 per annum, so we put those in at $5,000,000. And there are perhaps 6,500 registered nurses. I think we ought certainly to allow them $50 a month. That would be about $3,600,000. We have thus built up for professional care a sum of $14,600,000 before we have commenced to pay technicians, hospitalization, medicine and overhead on equipment. I think these figures indicate pretty definitely what a perfectly terrific public obligation is implied in complete social medicine under our present fiscal system.

Let us return again to the little diagram I made of the three centers, with the centers of guild medicine, state medicine and fiscal medicine. I have indicated there were bonds between them, that they run across and it is not possible to draw a perfectly sharp line between. Does there seem to be any sort of compromise which is really an effective one? In my opinion, the most effective one which has been found abroad has been one of coöperation of the state with the guild of medicine where the guild controls, in fact, the professional situation. This one finds to a fair degree, it seems to me, in Norway and in Sweden. But remember that these are countries that work under very peculiar conditions. There is one medical school in Norway; there are three small medical schools in Sweden. The number of students that enter these schools is controlled, and it is controlled very rigidly. Men wait for a very long while before completing their medical training. They undergo an exceedingly severe selection upon entering. There is little possibility of inflow of physicians from the outside, both on account of the legal qualifications and on account of the extreme language difficulty. Remember also that these countries have a society which is very highly stratified and one that is accustomed to complex social organization to an extent that we can hardly appreciate.

I have sometimes cited in this connection the liquor control situation in Sweden in comparison with the handling of this vexing question in the United States. In Sweden, the liquor situation seems to be excellently controlled. But it is handled by a social organization which is so complicated, so elaborate, and depends so much on respect for law, for moderation and for authority, that it is practically inconceivable that it could be worked here. Similarly, it is my opinion that any exact copying of any scheme of social medicine such as those used abroad is open to great question in our own country.

I have put a situation before you. I have offered no solution, for I have none. It seems to me there are two things which might be suggested as possible palliative measures and one which seems to me as an absolutely essential measure under any form of medical practice. The two palliative measures are these: First, any system of medicine can hardly continue to hold its high standards if it is flooded with unnecessary members, even though these be persons of high character and ability. Most people do not seem to realize that in this country the growth of population is decreasing very rapidly, and that as a matter of fact (and here I do agree with my distinguished colleague, Dr. Chapin) within less than a generation we will approach a stationary population. Indeed, we are approaching it very rapidly in certain areas now. We are producing medical men, and have been for the last decade, at a relative rate which is between five and seven times as fast as the population is growing, and we are registering physicians in this state at a rate of nearly three times as fast as the population is growing. As I have said to a number of you before, for every 400 new citizens added to this state, there is a new physician who locates here. Certainly this situation must eventually be controlled, both for the good of the public and for the good of medicine. In my opinion, that control can only come through the close coöperation of organized or guild medi-

*Quoted by permission from Minnesota Year Book, 1931, League of Minnesota Municipalities, page 63.

cine, the medical and basic science boards and through the institutions engaged in medical education.

The second palliative measure is, as was pointed out this afternoon, the fact that the physician should receive some compensation, at least, for the charity work he does. It certainly is not just to pick out one class in society and require it to donate all services to people who cannot pay for them. I do not mean to say that each physician can be paid in the style to which he is accustomed, but at least something possibly can be done that way.

But primarily, it seems to me, the thing to do is to keep, strengthen and make firm your guild organization. As I have said, it has existed for 500 years. It has gone through the Reformation, it has gone through the commercial revolution, it has gone through the industrial revolution. It has proved its strength. Certainly those crises were as great as the one we face today. This, it seems to me, is the primary point in any program that you may adopt.

One word in closing. I was put down in the preliminary program of this meeting to speak on the relation of the University Hospital to the medical profession of the state and the practice of medicine. I think I ought to say a word about this subject. In doing so I want you to realize that I am a scholar gone wrong as an administrator, and that the opinions I express are my personal opinions because I am a recommending officer and not a directing officer of the University. Therefore, the views I express are only my individual conclusions.

It is my feeling that the University of Minnesota Medical School exists to train medical men to fill the gaps as men leave the profession or leave the state. In other words, to provide a supply of physicians. Second, to coöperate with physicians in the field. Third, to advance medical knowledge.

These are our three primary functions. In order to perform certain of these functions, it is necesary for us to be in contact with patients, and in my opinion our hospital exists primarily for that function. In so doing we must and will give those patients the very best possible service.

In times like the present we must do anything we can to help out the indigent, but we do it as part of our three primary functions: training the young physician, coöperating with the physician in the field, and advancing medical knowledge. We are then, in my opinion, not primarily a service institution in the sense of rendering the service that is required for all the indigent. We are a service institution to the extent to which we take care of the people in our hospital.

I take that position on two grounds. In the first place, if our function is to train those who are to take care of the ill, well-to-do or needy, certainly to take over the function of general medical care after we have trained other people to do it seems to be somewhat of a logical absurdity.

Second, our hands are quite full enough with the task that has already been placed in them.

SOME UNUSUALLY LARGE GALLBLADDERS: A CLINICOPATHOLOGIC STUDY*

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and
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NOT long ago a woman presented herself at The Mayo Clinic because of a large tumor in the right upper quadrant of the abdomen. Examination and operation proved this to be a gallbladder measuring 20 by 10 by 10 centimeters. The history of the case did not suggest disease of the gallbladder. Even questioning the patient again after operation failed to disclose any history of pain, intolerance to food, or gaseous distention. The huge size of the organ and the fact that it had become so without causing symptoms prompted a search of the records of the clinic to see if this were a rarity.

The pathologic records of all the gallbladders which have been removed at the clinic (about

*Submitted for publication September 15, 1932.

18,000) between 1906 and 1932 were examined. Records of gallbladders measuring 15 cm. or more in length were studied, and the pathologic changes, the presence or absence of stones, and particularly the presence or absence of blockage of the cystic duct were noted. There were fifty-five cases in which the gallbladder was 15 cm. or more in length. The records of these cases were studied in reference to: (1) a palpable tumor; (2) a clear history of disease of the gallbladder; (3) the presence of symptoms other than those of the tumor, and (4) a history of jaundice. The results of these studies are shown in the tabulation.

In thirty-five of the fifty-five cases a clear history of disease of the gallbladder was obtained. By this is meant that the histories were sufficiently typical so that the examiner was able either to make an outright diagnosis of disease of the gallbladder or at least to suspect it strongly at his first examination without the aid of laboratory data. In sixteen the history of disease of the gallbladder was fairly clear, and the presence of a lesion was suspected, but the history was atypical and further study was required, especially roentgen-ray examination, to confirm the diagnosis. In two cases data concerning the gallbladder were obscure. In one of these cases the patient had symptoms of chronic nervous exhaustion, and the examination of the gallbladder was apparently almost accidental. In the other case the patient was "ailing" and attention was directed to the gallbladder by the presence of a palpable tumor in the right upper quadrant of the abdomen. The remaining two patients did not have symptoms suggestive of disease of the gallbladder; one of them complained of a large tumor in the right upper quadrant of the abdomen and the other had a goiter and the condition of the gallbladder was discovered at examination made as a routine. In both of these cases the gallbladder was very large, one being 20 by 10 by 10 cm. and the other 20 by 6 cm. It is hardly conceivable that the gallbladders should become so large without causing pain or symptoms (Figs. 1 and 2).

In thirty-eight of the fifty-five cases the tumor could be definitely felt and in three others a palpable tumor was questionable. The larger the organ the more often it was felt, as would be expected; the seven gallbladders which were 20 cm. long all were palpated, whereas only fifteen of the twenty-four measuring 15 cm. were palpated. In many cases the mass palpated was diagnosed as the gallbladder without question, especially when a clear history was obtained. In



Fig. 1. *(Above)* Gallbladder that measured 20 by 6 cm.
Fig. 2. *(Below)* Gallbladder that measured 20 by 10 by 10 cm.

other cases, however, normal kidney, tumor of the kidney, Riedel's lobe, tumor of the colon, pancreatic cyst, and desmoid were diagnosed. In eleven cases the presence of the tumor was the chief complaint.

In fifty-four of the fifty-five cases gallstones, single or multiple, were found. In the other case, stones had been removed from the gallbladder elsewhere six years before; the organ had been drained by bringing the fundus up under the skin. This accounts for the absence of the stones in this case when operation was performed at The Mayo Clinic, and the former presence of stones may have accounted in part for the length of the organ (19 cm.).

In thirty-four cases one or more stones were found impacted in the cystic duct or in the ampulla of the gallbladder. It seems likely that this condition had been present in other cases at some time. Possibly in some cases an impacted stone had been dislodged by the surgeon in his manipulations without his knowledge, or if noted he may have omitted it in the surgical notes. It may also have passed spontaneously into the common bile duct or back into the gallbladder.

In only four cases was there a history of jaundice; in one case there was a question of

SUMMARY OF DATA

Size, cm.	Cases	History				Chief complaint, tumor	Palpable tumor	Stone	Stones in cystic duct	Jaundice	Pathologic change	Comment
		Good	Fair	Poor	None							
20	7	2	3		2	1	7	7	4			
19	4	3	1			2	3	3	3		1 subacute	1 patient was operated on before
18	6	5	1			1	3	6	3	1(?)	1 subacute	
17	7	5	2			2	4	7	4	1	1 acute	1 patient had stones in common bile duct
16	7	4	3			2	6(1?)	7	7	1	1 acute	
15	24	16	6	2		3	15(2?)	24	13	2	5 subacute 3 acute	1 patient had stones in common bile duct
Total	55	35	16	2	2	11	38(3?)	54	34	4(?)	7 subacute 5 acute	

slight jaundice on one occasion. In only two cases were stones found in the common bile duct.

The condition in almost all of the cases was chronic cystic cholecystitis with cholelithiasis. In seven cases the condition was subacute and in five acute, usually superimposed on chronic cholecystitis. In one case carcinoma of the cystic duct was found.

CONCLUSIONS AND SUMMARY

This group of unusually large gallbladders includes all gallbladders measuring 15 cm. or more in length removed at The Mayo Clinic. Fifty-five such gallbladders were found in more than 18,000. The significance of the presence of gallstones in the formation of these large organs is shown by the fact that in fifty-four of the fifty-five cases stones were found at operation at the clinic; in the other case stones had been removed elsewhere. Impaction of the cystic duct was found in thirty-four of the fifty-five cases; it is suggested that actually it was present in a larger number at some time, the stone having been displaced, or having been passed spontaneously through the duct, or it had slipped back into the gallbladder.

In most cases symptoms were elicited, but in two cases in which the gallbladder was 20 cm. long, the patient had no complaints referable to the organ. Jaundice was uncommon.

HYPOPLASIA OF THE AORTA AS A POSSIBLE CAUSE OF CARDIAC FAILURE*

REPORT OF CASES

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Saint Paul

HYPOPLASIA of the aorta has rarely been recognized in recent years as a cause of serious cardiac decompensation. Probably not more than ten cases have been reported during the last twenty-five years and today it is scarcely mentioned either by the clinician or the pathologist. It seems evident that the condition has been practically ignored as a cause of cardiac disease by the conservative opinion of the contemporary medical world. It is of interest, nevertheless, to appreciate the fact that some 100 cases were reported in a period of nearly 150 years, extending from 1761 when Morgagni described the first case to 1907 when von Ritook[1] wrote his paper, the last of the several notable

*From the Pathological Laboratories of the Charles T. Miller Hospital, Inc., and the Amherst H. Wilder Dispensary, Saint Paul, Minnesota, and the Department of Pathology, University of Minnesota, Minneapolis, Minnesota.

contributions, on the subject. Critical study of many of these reports reveals, moreover, that cases of aortic hypoplasia uncomplicated by coexisting major lesions and terminating in evident cardiac death, are relatively uncommon and constitute a distinct and interesting clinical and pathological group which should deserve further study by the student of medicine.

Attempt will be made to reintroduce hypoplasia of the aorta as a possible cause of fatal cardiac decompensation among young individuals, by reporting four cases with necropsy findings and by advancing the cardinal diagnostic criteria of this condition through a brief review of the literature.

DEFINITION

Hypoplasia of the aortic system is defined by Maude E. Abbott[2] as that condition in which "the lumen of the arterial vessels in the greater circulation remains abnormally small and the walls unusually thin and elastic." She adds further that "although there has been some debate as to the pathological significance of the condition, it must be given a place in the pathogenesis as one of the special causes of cardiac disease." The condition was variously designated by such terms as "Unnatural narrowness of the aorta" (King, 1841), "Constriction of the aorta" (Hutchinson, 1879), "Congenital narrowness of the aorta" (Kuhleukampf, 1873; Kuessner, 1879), "Stenosis of the aortic system" (Frantzel, 1888), "Congenital uniform stenosis of the aorta" (Ortner, 1891), "Congenital stenosis of the aortic system" (Spitzer, 1897), "Congenital narrowness of the aortic system" (Burke, 1901-02), "General narrowness of the aortic system" (Apelt, 1905), "Hypoplasia of the arterial system" (von Ritook, 1907), "Aortic Hypoplasia" (Werley, 1927), "Hypoplasia of the Aorta" (Philpott, 1929).

Burke[3] in his classical articles published in 1901 and 1902, states that "the occurrence of phenomena with this finding (a general narrowness of the aorta) which cannot be otherwise considered than as a circulatory disturbance, as well as the discovery made by the early authors that this affection often leads to hypertrophy of the left heart, must bring us to the conclusion, though contrary to the reported views of other authors, that through a general narrowness of the aorta, a series of resulting circulatory phenomena, particularly in the heart, are caused." He, like many others, however, failed to determine the limits within which the measurements of the aorta must fall, before a diagnosis of hypoplasia can be established. He simply states that "it must be left to the individual observer, whether, in a case in question, the vessels were narrow or not." This opinion was apparently shared by the majority of the earlier observers in making the diagnosis of hypoplasia of the aorta. Many of them failed to state the exact measurements of the aorta which they reported as hypoplastic. This ambiguity in the anatomical definition of this condition which has led to the very wide discrepancy, among observers, as to its incidence; the introduction into the discussion, of the various types of hypoplasia of the aorta with or without cardiac involvement; the consideration of possible pathogenesis of this condition and the resulting cardiac failure, and the fact also that there have been in our routine necropsy practice frequent instances of this condition without cardiac complication, have made it most difficult to accept the assumption that hypoplasia of the aorta, in a given case, may cause a cardiac failure and death.

NORMAL CIRCUMFERENCE OF THE AORTA

The anatomical diagnosis of hypoplasia of the aorta must, necessarily, be based upon the knowledge of the accepted figures, if any, of the normal measurements of that organ. Schiele-Wiegandt,[4] in a study of the circumference and thickness of the artery in ninety-nine human bodies, found the mean figures at various levels in eight men between twenty and thirty years of age, as follows: above the aortic valve, 6.26 cm. and 0.139 cm.; below the left subclavian artery, 4.88 cm. and 0.100 cm.; and above the bifurcation, 3.12 cm. and 0.088 cm. in circumference and thickness, respectively. Six women of the corresponding age period gave the following mean figures for the same levels: 5.55 cm. and 0.115 cm. above the aortic valve; 4.40 cm. and 0.083 cm. below the left subclavian artery; and 2.64 cm. and 0.077 cm. at the bifurcation, in circumference and thickness, respectively. Beneke[5] found the following figures in individuals between nineteen and twenty-one years of age: 5.45 cm., 4.1 cm., and 2.9 cm. in circumference at the aortic, thoracic and abdominal levels, respectively, and those between twenty-four and

thirty-one years of age, 6.00 cm., 4.3 cm. and 3.1 cm. in circumference, at the corresponding levels, respectively. Suter[6] found in men between twenty-one and thirty years of age a circumference of 6.42 at the aortic orifice, and in women 5.97 cm. Thoma[7] gave 2.24 cm. as the diameter (7.037 cm. in circumference) of the aorta at its orifice in individuals between twenty-three and twenty-nine years of age and 2.07 cm. in diameter (6.503 cm. in circumference) between seventeen and twenty years of age. Von Ritook assumed that in adults (all ages and both sexes) a narrowing below 5.5 cm. in circumference at the aortic orifice could not be compensated while a measurement below 6.0 cm. could be compensated.

From these observations, it may be conveniently assumed that, in men between twenty and thirty years of age, the aorta from 5.5 cm. to 6.42 cm. in circumference at the aortic orifice and in women of the corresponding age period, from 5.5 cm. to 5.97 cm., may be considered normal.

Figures of the aortic circumference in younger individuals were given by Suter as 5.11 cm. for males and 4.97 cm. for females between ten and fifteen years of age, and 6.10 cm. and 5.39 cm. between sixteen and twenty years of age in males and females, respectively. Beneke gave an average figure of 4.8 cm. for individuals between fourteen and a half and fifteen years of age, and 5.45 cm. between nineteen and twenty-one years of age. Thoma estimated an average diameter of the aorta to be 2.07 cm. in men and women between seventeen and twenty years of age.

It must be emphasized, however, that there is a considerable variation in the measurements of the normal aorta at various levels, in a given age and state of physical development, in both sexes, and that a hypoplastic aorta at necropsy may not be directly or even remotely related to the cause of death in a given case. Burke aptly concluded that the extent of cardiac involvement occasioned by this condition did not stand in direct proportion to the degree of aortic narrowness. Other factors such as the thinness and elasticity of the vessels, the volume of the blood in circulation, the intra-arterial pressure, physical exertion, physical development of the individual, et cetera, must be taken into consideration in the pathogenesis of cardiac failure in individuals with hypoplasia of the aorta. Herein probably lies the explanation as to why many individuals with a hypoplastic aorta do not show signs of cardiac disease nor die of heart failure.

HISTORICAL

The condition was first recorded by Morgagni[8] in 1761. He reported three cases. One was that of a thirty year old monk who died of "dropsy," and at autopsy showed an aorta with "a circumference of a finger" and a dilatation of the right ventricle. Merkel,[9] in 1768, reported the fourth case, in a seventeen year old girl who had frequent attacks of palpitation and in whom autopsy revealed a hypertrophy and dilatation of the heart, consequent upon "a congenital narrowness of the aortic system." Merkel was said to be the first to recognize the abnormal narrowness of the aortic system as a cause of cardiac hypertrophy. Nearly 70 years later, in 1837, the fifth case was reported by Hope[10] in a twenty-eight year old male of robust build but of a pale and tender complexion, who complained of palpitation, orthopnea, cough and slight edema of feet and pain in the cardiac region and who died from a typical cardiac failure. Autopsy showed a dilatation of both ventricles without hypertrophy of their walls, enormous dilatation of the right auricle, insufficiency of the mitral valve and "a remarkably narrow aorta." During the subsequent seventy years, nearly 100 cases were reported in the literature. Burke[3] in 1901 and Apelt[11] in 1905, reviewed the literature thoroughly and added detailed reports of their own cases. Von Ritook,[1] in 1907, reported on the result of the analytical study of seventy-three cases, fifty-three of which he collected from the literature and seventeen from his own laboratory. Since 1907, no important contributions on the subject have been made, only few brief reports on isolated cases having been recorded in the literature. G. Werley,[12] in 1927, was the last to publish a typical, uncomplicated case of hypoplasia of the aorta with death due to cardiac failure. His case, a young woman of twenty-two years of age, presented a clinical picture which, in many ways, closely resembled one of the cases to be reported here. Philpotts'[13] case, reported in 1929, may be regarded as the last contribution in the literature, except for the fact that it was complicated by an advanced stenosis of the mitral orifice due to an old rheumatic

disease, which, in itself, might easily be an important etiological factor in the production of the underdevelopment of the aorta in a growing young woman of seventeen years.

ETIOLOGY

In a series of 14,305 autopsies, recorded in the department of pathology of the University of Minnesota, prior to 1930, there were eight cases of aortic hypoplasia listed as a major anatomical diagnosis, all of which, curiously, were recognized prior to 1916. Six occurred in individuals twenty to twenty-six years of age and two at thirty-five years of age. Five showed a hypoplastic heart (136-210 grams) and two, a slight hypertrophy of the ventricles. One case occurred in association with perforation of the interventricular septum. None of the eight cases had any bearing upon the cause of death. Not a single diagnosis of this condition was made in a series of 11,451 autopsies between 1917 and 1930. This is significant.

Von Ritook[1] found fifty-seven cases showing an arterial hypoplasia in 395 autopsies, or a ratio of one such condition in seven or eight autopsies. This is the largest incidence of this condition recorded in the literature. Cabot[14] found nineteen hypoplastic aortas in 1,846 autopsies or one in ninety-seven; ten of them occurred as the only cardiac lesions and nine with other lesions. Of the 1,145 autopsies showing a single cardiac lesion, he found fifteen hypoplasias of the aorta, ten without cardiac hypertrophy and dilatation and five with such hypertrophy and dilatation. He failed to elaborate on this condition as a possible cause of cardiac disease. Paul White[15] states that hypoplasia of the aorta is "probably the commonest of the congenital aortic anomalies, but in high degree, it is relatively rare and it is then usually associated with other congenital cardio-vascular defects." Maude E. Abbott[16] writes that she has never personally seen a pure uncomplicated case of hypoplasia of the aorta but mentions several instances in association with other major lesions of the heart. In a study[17] of 200 recorded cases of coarctation of the aorta, she reported, as an associated finding, twenty-one cases (10 per cent), of hypoplasia of the aorta, ranging in circumference from 5.0 cm. to 6.5 cm. in males and from 4.6 cm. to 4.8 cm. in females, above the aortic leaflets.

Etiologically, Burke[3] divides the cases into two groups: (1) those of the purely congenital origin or due to an error in the embryological development of the organism; and (2) those attributed to the arrest or retardation of the growth of the arterial system from unknown causes, during the formative period of adolescence.

The theory of the congenital or intra-uterine origin of this condition was first suggested by Rokitansky[18] in 1839. He observed a certain causal connection between the lack of development of the genital organs and the general narrowness of the blood vessels. Such other congenital defects as hypospadias, incomplete closure of the inguinal rings and various developmental anomalies of the heart and, less frequently, of other visceral organs, have been reported in association with this condition. A few other investigators have observed the condition in individuals possessing the so-called thymico-lymphatic constitution. Philpott's[13] case was the most recent and outstanding of the examples illustrating this alleged association. Delafield[19] states that "it is apparently a congenital defect and while not limited to well defined cases of lymphatic constitution, appears in this connection." It is of interest to recall that in the seventy-three cases collected by von Ritook, there was only one case complicated by a congenital anomaly and this was in the form of a defect in the interventricular septum.

Most recorded cases have been unassociated with congenital defects, or with the tendency to the thymico-lymphatic constitution. The condition has occurred in young adults often with robust health and well developed musculature and perfectly normal genitals. Cardiac weakness became manifest, as a rule, for the first time, rather suddenly, immediately following exertion or an infection. Of the eighteen cases of cardiac decompensation caused by arterial hypoplasia, carefully studied by von Ritook, ten were characterized by an especially well developed body structure and considered themselves absolutely healthy and were engaged in strenuous physical activity, nearly up to the appearance of severe cardiac symptoms. In only five of these, was there a history of the first subjective symptoms appearing prior to the severe physical exertion. It would appear that a sudden arrest or retardation in the growth of the arterial system, in an otherwise healthy and rapidly growing individual, probably brings about a sudden circulatory

over-loading and unbalance which eventually results in cardiac failure.

Of the sixty-seven autopsied cases of von Ritook,[1] twenty-one occurred between the ages from ten to twenty-one; thirty-one from twenty-two to thirty-one years; two from fifty-three to fifty-six years and one at the age of eight. In other words, fifty-two of the sixty-seven cases (77 per cent) of the series occurred in individuals between ten and thirty-one years of age. The condition may, therefore, be said to be essentially and predominantly, if not exclusively, a disease of youth. In the same series, thirty-six cases were males and twenty-six females.

After a careful analysis of nearly 100 cases reported up to 1901, Burke[3] further proposes the following classification of hypoplasia of the aorta.

1. Hypoplasia of the aorta with the so-called blood diseases such as chlorosis (Virchow), pernicious anemia, hemophilia, purpura hemorrhagica.
2. Hypoplasia of the aorta in connection with infectious diseases as a predisposing or exciting factor in the fatal termination.
3. Hypoplasia of the aorta in association with the general dystrophies such as acromegaly, dwarfism, etc.
4. Hypoplasia of the aorta as an exciting cause of, or presenting a picture of, a heart disease.

Cases representing the first three groups are omitted from further discussion.

CLINICAL DIAGNOSIS

Cases which constitute the fourth group present, as already sketched, a clinical picture of a cardiac disease, resulting in failure and ultimate death. These cases belong in the second of the etiological group proposed by Burke and occur in young, healthy individuals, due to the arrest or retardation of the growth of the arterial system from unknown causes. Clinically, the diagnosis is extremely difficult, if not impossible. Fraentzel,[20] in 1872, was the first to make a clinical diagnosis of hypoplasia of the aorta which was proven by postmortem examination. Both of the cases reported by Apelt[11] in 1905 were clinically diagnosed by Lenhartz. A few cases have been diagnosed as a congenital disease of the heart. Runneberg[21] in 1890 ventured a diagnosis of idiopathic hypertrophy of the heart. The outstanding feature of the disease, common to many of the well studied cases, is the practical absence of the clinical and physical signs which may be considered pathognomonic of a known cardiac lesion.

Fraentzel's case was that of a man, thirty-four years of age, well developed in build and musculature, who showed considerable edema and dyspnea when first seen. Temperature was 36.9°C, pulse 114 and respiration 28. There was some coughing with expectoration of a blood-tinged sputum. The apex was in the sixth intercostal space, 2.5 cm. out of the left mammary line. Signs of aortic insufficiency were present. Both the second aortic and second pulmonic sounds were accentuated. The radial, carotid and femoral arteries were narrow, tense and thick walled. The liver was negative. Since the age of fifteen, the patient had suffered from palpitation associated with dyspnea. There was no history of rheumatism. The patient was admitted on September 19, 1872, with a diagnosis of congenital stenosis of the entire aortic system. He was readmitted on November 2, 1872, with symptoms more exaggerated and died on December 1. Autopsy revealed the heart enlarged, the ventricles being hypertrophied and dilated. The lumen of the aorta was extremely narrow and its intima showed a high degree of diffuse sclerosis.

Fraentzel made the following comments, "In a number of cases, we have to deal with congenital narrowing of the lumen of the aortic system which leads to no symptoms early in life and which is compensated by hypertrophy of the left ventricle. The hypertrophy becomes more and more pronounced and sooner or later becomes combined with a dilatation. Gradually, there develops the first compensation disturbances, especially when, with the progress in years, more stress is placed on the left ventricle. Death follows sooner or later as a result of the disturbances in compensation."

Apelt's first case was a young man, twenty-one years of age, medium sized and normally developed, who had been engaged in hard labor for several years. His illness began with pain in the upper abdomen, cough, and shortness of breath. He was cyanotic and the skin slightly icteric. The heart was not enlarged. The cardiac sounds were pure and soft. The second pulmonic sound was very loud. The pulse was very small, easily

compressible, irregular and 112 per minute. The liver extended one finger's breadth below the costal margin. The urine was negative. The cyanosis persisted. The pulse was poor, blood pressure 60. There was a slight rise in evening temperature. There were occasional attacks of dyspnea. The edema was increasing. Later, the cardiac dullness extended two fingers' breadth beyond the sternal border on the right. The sputum became hemorrhagic. The heart sounds remained pure. Because of the age of the patient and because there were no signs of valvular disease and because digitalis gave no results, Lenhartz ventured a diagnosis of possible general narrowness of the aortic system. At autopsy, the heart was enormously distended and at the base measured 15 cm. All the cavities of the heart were enormously dilated. The left ventricle was the size of a goose egg. The valves were soft. In the left ventricle, the endocardium was slightly thickened, whitish and cloudy. The walls of the left ventricle were from 1.75 cm. to 2.00 cm. in thickness, and the right, 0.5 cm. The aorta was 5 cm. in circumference at the beginning portion and 3.5 cm. in the abdominal region. The intima as well as the entire wall was normal.

The second case of Apelt's was that of a seventeen year old boy, medium sized, slender and pale, with a well developed musculature. He was frequently subjected to considerable physical exertion. He had never had palpitation of the heart. His illness began with a cough. About six weeks later, he suddenly became very weak and short of breath. The cough increased. There was no palpitation at this time. He was cyanotic and edematous over the dependent portions. There was a large area of palpable pulsation in the cardiac region. The cardiac sounds were clear. The second aortic and pulmonic sounds were loud. The pulse was rapid, irregular, unequal and compressible. The liver was palpable and tender. The urine showed albumin. There were cough, nausea and vomiting. The temperature rose to 100 each evening. The eye grounds were normal. The edema was increasing. Blood culture was sterile. A soft, systolic murmur developed at the apex which later disappeared. Jaundice now appeared. The sputum was bloody. On account of the youth of the patient, his occupation, his build, the peculiar clinical findings and course of the illness, Lenhartz made a diagnosis of general narrowness of the aorta. At autopsy, the heart was 13 cm. in width at the base and weighed 495 grams. Both ventricles were markedly dilated, particularly the left. The auricles were also dilated. The thickness of the left ventricle was 1.6 cm., and that of the right, 0.5 cm. The valves were flat. The aorta was 1.9 cm. in diameter or 5.9 cm. in circumference at the beginning portion. The wall of the aorta was soft and thin, being 0.75 mm. in thickness at the beginning portion.

The clinical course and mode of death in this group of aortic hypoplasia are invariably cardiac. In the sixty-seven cases in the heterogeneous group of aortic hypoplasia ending in cardiac death which came to autopsy, von Ritook[1] found thirty-one with hypertrophy of the left ventricle, in twelve of which there was no dilatation, and twenty-seven with hypertrophy of the right ventricle, in twelve of which there was no dilatation. Seven cases showed dilatation of the left ventricle without hypertrophy, and eleven, dilatation of the right ventricle without hypertrophy. Eleven showed a normal left ventricle, and thirteen a normal right ventricle. Ten cases showed hypoplasia of the heart, as well. In nine it involved both sides, while in one case, the left was hypoplastic and the right, hypertrophic. A hypoplastic heart is considered by von Ritook to be incapable of hypertrophy for lack of "normal reserve power" of the myocardium. That such a heart may fail is illustrated by a case reported by Spitzer[22] where "the heart was in size similar to that of a child" in "a large, well developed, very muscular man with a pronounced panniculus adiposus."

The following diagnostic criteria have been gathered from various authors.

The condition is found among young people, usually between fifteen and thirty years of age, more often among well developed, healthy, and robust young males but also, perhaps less frequently, in pale, slender and clear skinned individuals, and particularly in those athletically inclined or engaged in strenuous physical labor. It affects males more frequently than females. Congenital anomalies are rarely encountered. If present, they are of a positive aid in diagnosis. As a rule, individuals in this group are said to show diminished resistance to infectious diseases. Presenting symptoms are those of cardiac decompensation of unexplainable causation and of

a comparatively short duration. No previous attacks are usually recorded, although in a small number of cases a history of slight cardiac discomfort may be elicited in their childhood. Onset is usually sudden and unexpected, coming on while at work or following an acute infection or strain which may be comparatively slight. Irritating cough may usher in the symptoms. Dyspnea and palpitation develop sooner or later and increase in severity with the progress of the disease. Cyanosis is usually present, particularly toward the end. Feeling of constriction and pressure in the chest may be complained of. These may constitute the only clinical manifestations in cases where death occurs suddenly without a history of onset or it follows a few days after the onset. The majority of them, however, rapidly progress into a state of cardiac decompensation with a rapidly developing passive congestion of the liver, which accounts for the loss of appetite, nausea, abdominal pain and diarrhea which may constitute prominent symptoms, early to develop and to remain throughout the course of the illness. Edema invariably develops. Spitzer[22] considers the edema in hypoplasia of the aorta to be of the hypostatic type, differentiating it from that of renal origin or that usual in cardiac failure. The temperature is likely to be subnormal. A high degree of fever is not attained, even in the presence of infection. The extremities are usually cold. Noteworthy is the highly anxious expression and striking pallor of the patient. The latter is explained partly by the hypoplasia of the minute peripheral vessels. The patient is usually alert and apprehensive. The heart is invariably enlarged, first to the left and soon to the right. At first, only the hypertrophy of the left ventricle supervenes. Compensation of the heart may be maintained indefinitely through the hypertrophy of the left ventricle. With increasing compensatory efforts, hypertrophy of the right ventricle usually follows. Dilatation of the chambers may gradually take place or may suddenly develop, depending upon the severity of the insult and the duration of the illness. The apex beat is displaced to the left, circumscribed or heaving diffusely and indistinct. The cardiac tones are usually described as pure and unmuffled. Murmurs may develop later. They may disappear after a period of rest. The pulmonary second sound is always accentuated. The jugular pulsation is usually absent. The radial arteries are small and the walls are delicate but the tension of the pulse is high. The retinal arteries may also be used as an index of the size of the artery. Hypertension is not the rule. Signs of mitral insufficiency and increasing embarrassment to the pulmonary circulation become more and more evident. Sputum becomes hemorrhagic toward the end, due to passive congestion or infarction. Jaundice may also develop. Clinically, the duration of the disease is from a few days to a year. Death is invariable.

At autopsy, the primary seat of the anomaly is to be found in the aorta, extending from the base of the heart to the various arterial trunks. The circumference of the aorta at its origin and at various points is, as already mentioned, definitely decreased. The intimal surface is, as a rule, smooth or may be streaked with a few yellow, atheromatous plaques. The thickness of the wall is said to be decreased. Smaller arteries are also said to be proportionately involved, although no convincing physiological or anatomical evidence has been put forward to support such a view. It would seem that with decreased intra-arterial pressure, occasioned by the narrowing of the aorta, the peripheral vessels are likely to be less distended and, therefore, are apparently more delicate. The heart is always involved. Hypertrophy of the ventricles with or without dilatation is the cardinal feature of the disease. The heart may resemble that in primary hypertension. An enormous, left ventricular hypertrophy may constitute the most prominent finding; this is more likely to be found in subjects with a short clinical course. Or a marked dilatation of the chambers, both right and left, with only a relative hypertrophy of the walls may be the most striking picture. Such a heart is found usually in those with a more prolonged clinical course. Rarely, the heart may be found hypoplastic with or without dilatation. Microscopically, there is no demonstrable evidence of degeneration, fibrosis or inflammation in the myocardium. The mural endocardium shows no lesion which may account for the cardiac hypertrophy and dilatation. The arterial walls show no degenerative or inflammatory changes. Variation in relative thickness of the three coats has been observed but this probably is of no significance.

Changes in the visceral organs, notably, the lungs and the liver, consequential to the circulatory failure, are evident, as is edema in the soft tissue and the body cavities. Duration of the disease usually governs the extent of these changes which are not unlike those found in any cardiac failure.

DISCUSSION

The impression prevails that hypoplastic aorta is not at all an uncommon finding in routine autopsy practice and, therefore, isolated instances of fatal cardiac failure in individuals showing no other lesion than a cardiac enlargement and a hypoplasia of the aorta cannot be explained on the latter finding alone. It is contended that if a decreased calibre of the lumen of the aorta alone should cause a cardiac hypertrophy and subsequent failure, far more cases than hitherto reported should be found at autopsy and find their way into the current literature.

However, with our present knowledge of the pathological physiology governing the mechanism of cardiac hypertrophy and failure where no tangible lesion is demonstrated, it would seem reasonable to assume that the narrowness of the aorta, which must necessarily offer a continued resistance to the forward flow of the blood, may be considered a factor contributing, more or less, to the hypertrophy and subsequent failure of the heart. The fact that the majority of hypoplastic aortas (which usually accompany a hypoplastic heart) seemingly cause no cardiac embarrassment, may be explained by the assumption that in those individuals there is probably a sustained circulatory balance and compensation which obviates over-loading of the heart and that undue circulatory demand by reason of excessive physical exertion or development is probably lacking. It is apparent that in these cases the aorta, itself, contributes little, if any, toward the compensatory efforts of the heart. No conclusive histologic evidence has been put forward to show that there are intrinsic changes in the wall of the aorta to such an extent as to influence the established circulatory balance. Changes observed in the wall of the aorta are doubtless secondary to the cardiac failure.

The fact that the occurrence of this condition is confined almost solely to the adolescent and post-adolescent periods is of great significance. It is assumed that in the physical growth of man, during these formative years, there is constant adjustment in the physiological processes of the body. It is further assumed that in some individuals, for some unknown cause or causes, the physiologic demand on the cardio-vascular system becomes too great or too sudden for the necessary adjustment, either on the part of the aorta alone or on the part of the heart as well as the aorta, which probably results in cardiac decompensation and, often, in sudden death.

REPORT OF CASES

Case 1.—F. E. J., a white male, twenty-eight years of age, fell dead while on his way to work on the morning of April 23, 1930. Bystanders had seen him running slowly just before he fell down on the sidewalk. He was found markedly cyanotic when picked up and died soon afterward. On April 17, or six days prior to death, the man suffered a sharp precordial pain while attempting to crank a street flushing machine. The pain continued for several hours. It was described as sharp and cramp-like in character and present over the precordium and in the left upper quadrant. He was dyspneic but was not cyanotic during this period. The following morning, he apparently felt no ill-effect from the attack of the previous day. Nothing unusual was noted by the members of the family. Following a three days' holiday rest, he returned to work on April 21 and worked for two days, apparently as usual, as a street flusher. Past history was unimportant except that he had an attack of influenza in 1918, when he was told that he had a "leakage" of the heart. He appeared robust and muscular in build, athletically inclined and had always indulged in strenuous sports without apparent ill-effect. In February of this year, he had a physical examination for a government position and was pronounced physically fit. His blood pressure at the time was normal.

Necropsy Findings.—The body was embalmed on the day of death, April 23, 1930, and buried. It was exhumed on May 19, 1930, or twenty-six days later, for examination. The body was well developed and well nourished, 180 cm. in length and approximately 175 pounds in weight. The muscles were well developed. No jaundice was noted. The pupils were equal and 5 mm. in diameter. There were patches of mould growths and areas of mahogany and greenish discoloration over various parts of the body. The fingers were dry and shrunken. There were no marks indicative of external violence. The external genitalia were normal.

The peritoneal cavity contained no excess fluid. The appendix was 11.5 cm. in length and 7 mm. in average diameter, retrocecally located and firmly adherent to the posterior peritoneum and ran perpendicularly upward toward the gallbladder.

The pleural and pericardial cavities contained no excess amount of fluid and showed no adhesions.

The heart weighed 525 grams (Figs. 1 and 2). The epicardium was smooth and showed no excess fat. The wall of the left ventricle showed a marked concentric hypertrophy, was dark red in color and solid in consistence. It was 22 mm. in thickness. The chamber was moderately dilated. The right auricle was greatly dilated. The left ventricle was 7 cm. in depth and the right, 6.5 cm. The valves were essentially normal. The free edges of the aortic leaflets appeared slightly indurated. The tricuspid orifice was 12.3 cm. in circumference; the pulmonary, 8.2 cm.; the mitral, 9.5 cm.; and the aortic, 5.5 cm. The coronary vessels were normal. The root of the aorta showed a smooth intimal surface. The aorta was definitely small. It showed a circumference of 5.5 cm. above the aortic valve, 4.0 cm. at the arch. There was a distinct shortening and narrowing (Fig. 3) at the arch (1.2 cm. in diameter). The thoracic portion was 4.5 cm. in circumference.

The left lung was 420 grams in weight and the right, 825 grams. The lower lobes and the dependent parts were diffusely dark red and filled with blood and fluid.

The spleen weighed 170 grams. The pulp was dark red and solid.

The liver was 1,950 grams in weight. The lower border extended down 4 cm. below the xiphoid process. The markings were indistinct, due probably to autolysis, except along the peripheries where the centers of the lobules could be well identified.

The gastro-intestinal tract, the pancreas and the adrenals were grossly normal.

The right kidney was 125 grams in weight and the left, 130 grams. The capsules stripped readily, leaving slightly lobulated surfaces. The cut surface was deep red and showed normal markings.

The genital organs were normal.

The mediastinal lymph nodes were somewhat swollen and prominent.

The thymus was practically absent.

There were no congenital anomalies or deformitis.

Diagnoses.—1. Hypoplasia of the aorta. 2. Cardiac hypertrophy (the left and right ventricles). 3. Edema and congestion of the lungs. 4. Passive congestion of the liver, spleen and kidneys.

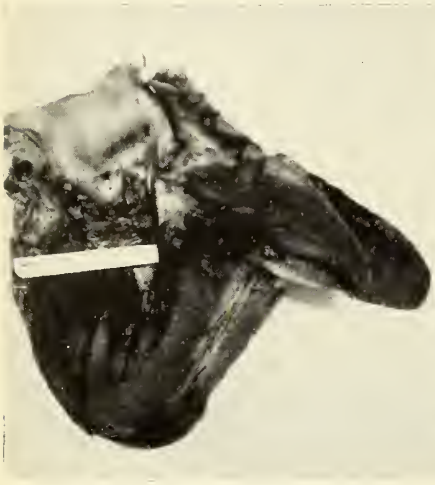


Fig. 1. Case 1. Heart, 525 grams. Marked hypertrophy of the left ventricle. Circumference above the aortic valve, 5.5 cm.



Fig. 2. Case 1. Heart arch and thoracic aorta, reconstructed, posterior view. Note an extremely small arch.



Fig. 3. Case 1. Arch of aorta, sectioned at the turn, showing a narrow lumen.

Microscopic Examination.—The heart showed no evidence of disease. There was no fatty infiltration, amyloid degeneration, fibrosis or inflammation of the myocardium. The aorta showed no degeneration or inflammatory changes in its walls. The kidney showed no evidence of arteriolar disease. The lungs, liver and spleen showed acute passive congestion to a marked degree.

Comment.—It is interesting to note that the patient had a "leakage" of the heart in 1918. Doubtless his heart was, then, temporarily decompensated following the attack of influenza. He evidently was able to make a complete recovery from this illness. His heart had since undergone continued compensatory hypertrophy without failure, under almost constant strenuous physical exertion. Sudden overstrain resulting from heavy cranking, however, brought on the acute decompensation of the heart from which recovery was impossible. Death occurred within a week.

*Case 2**.—M. S., female, white, single, twenty-three years of age, whose present illness dated back to May 2, 1930, or two and a half months before death, when patient suffered from "stomach flu" or gastro-intestinal upset, vomiting and dyspnea, with no fever. Patient had caught cold, felt sick headache, queer pains in ab-

*From the Medical Service of Dr. Edgar T. Herrmann.

domen with nausea and vomiting. Then, her heart began to beat rapidly, breathing became short and she felt tired easily. On her first admission to the hospital on May 12, her heart showed soft gallop rhythm but no murmurus, and the lungs, some moist râles in the bases. Blood pressure was 86 systolic and 70 diastolic.



Fig. 4. Case 2. Heart at six foot distance taken August 2, 1929. Transverse diameter 11.5 cm. (43.7 per cent of T. D.)

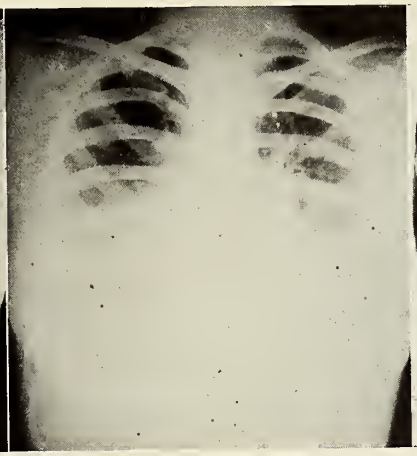


Fig. 5. Case 2. Heart at six foot distance taken May 12, 1930. Transverse diameter 15.2 cm. (55.6 per cent of T. D.)

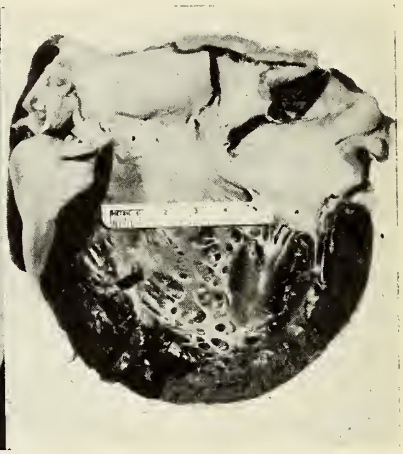


Fig. 6. Case 2. Heart, 400 grams. Hypertrophy and dilatation of the left ventricle. Circumference above the aortic valve, 5.0 cm.

Abdomen and extremities were negative. Repeated urinalyses were negative. Hemoglobin ranged between 75 and 80 per cent; erythrocytes between 4,000,000 and 4,500,000; leukocytes, between 9,000 and 15,000, with lymphocytes up to 52 per cent. Throat culture was negative for diphtheria. The basal metabolic rate was plus two per cent. Electro-cardiograms showed a weakened myocardium and, at one time, delayed auriculo-ventricular conduction. Temperature was subnormal most of the time. Pulse ranged between 100 and 125 and respiration from 18 to 22 per minute. Patient was discharged on June 12 as improved, with a diagnosis of toxic myocardium. Patient was readmitted on July 8, 1930, with aggravation of the above symptoms, particularly referable to the gastro-intestinal tract. She was nauseated, belched much gas and vomited several times a day. The vomitus consisted mostly of bile. Food could not be kept down. There was generalized abdominal pain. Slight relief was obtained from belladonna. The bowels had been loose, two or three movements a day. No blood was noted in the stools. Cyanosis and dyspnea became more and more marked. Two days before death, there were signs of fluid in the right pleural cavity. The roentgenograms showed a diffuse cloudiness of the right lower field which was interpreted to be either pleural effusion or pulmonary infarct. Thoracentesis was done and about 40 c.c. of bloody fluid was obtained. Patient coughed up some bloody sputum. The heart showed no murmurs at any time. There were no palpable thrills. The outline of the heart showed a gradual enlargement since the onset of illness both roentgenologically and on percussion. Death occurred on July 18, 1930, or two and a half months after the onset of illness. Urinalyses were repeatedly negative. Feces showed nothing of interest. Blood remained about the same with tendency to relative lymphocytosis and showing toxic changes in the neutrophils. The Van den Bergh test showed a two plus direct immediate reaction and also a two plus indirect reaction, with 2.5 mgms. of bilirubin per 100 c.c. of blood. Blood chlorides were 460 mgms. Blood culture was negative.

Past history was of no significance except that the patient was always somewhat anemic with hemoglobin ranging between 70 and 80 per cent, 4,000,000 erythrocytes and a normal leukocyte count. The differential count always showed a tendency to relative lymphocytosis. She had had an appendectomy in 1925. Her roentgen diagnosis at the time had been moderate visceroptosis. Roentgenograms of her heart (Fig. 4) made on August 2, 1929, showed a transverse diameter of 11.5 cm., which was 43.7 per cent of the thoracic diameter. On May 12, 1930, ten days after the onset of the present illness, the transverse diameter of the heart was 15.2 cm., which was 56.6 per cent of the thoracic diameter. The heart, at this time, showed a globular enlargement both to the right (m.r. 5.6 cm.) and to the left (m.l. 9.6 cm.) with a small, short and narrow arch, 4.9 cm. in diameter (Fig. 5). Subsequent roentgenograms of the chest showed a progressive enlargement of the heart in all directions, such as might be expected in a failure.

Necropsy findings.—The body was that of a well developed, well nourished, adult white female, 166 cm. in length and about 140 pounds in weight. There was no rigor. There was a slight degree of hypostasis in the dependent parts. There was no appreciable amount of edema. No jaundice was detected although the skin was waxy and pale. The finger tips were slightly cyanotic. The pupils were equal and 6 mm. in diameter. There was a 12 cm. right rectus scar. The breasts

were well developed. The external genitalia were normal.

The subcutaneous adipose tissue was well preserved.

The peritoneal cavity contained approximately 200 c.c. of clear, amber fluid. The appendix was absent. The liver extended 4 cm. from the xiphoid process and 3 cm. from the costal margin on the right side. The diaphragm was at the fourth rib on the right and fifth rib on the left.

The right pleural cavity contained approximately 300 c.c. of dirty, bloody, amber fluid. The left pleural cavity contained no fluid or adhesions.

The pericardial cavity contained about 125 c.c. of clear, straw-colored fluid. No adhesions.

The heart, in situ, with pericardium intact, was 15 cm. in transverse diameter. It weighed 400 grams (Fig. 6). It was greatly distended with blood. The epicardium was stretched and smooth. The myocardium was dark, beefy red and somewhat soft in consistence. The left ventricle was 1.3 cm. in thickness. The right ventricle was 4 mm. in thickness. The chambers were markedly dilated. The left ventricle was 9 cm. in depth and the right, 9.5 cm. The valves showed no disease. The tricuspid ring was 14 cm. in circumference; the mitral, 11 cm.; the pulmonary, 7 cm.; and the aortic, 5 cm. A small, well organized thrombus was noted in the right auricular appendix and along the apex of the left ventricle. The mural endocardium was smooth except for an area of grayish, fibrous thickening along the left ventricle. The coronary arteries showed no disease and at their orifices they were not more than 2.5 mm. in diameter. The root of the aorta showed a smooth, elastic wall. The intimal surface was shiny. The arch was reduced in diameter, as were the great vessels arising from it.

The aorta and its main branches were decreased in size throughout. The ascending aorta just above the valve was 5.0 cm. in circumference. The thoracic portion below the left subclavian artery was 3.5 cm., and the abdominal portion near the bifurcation, 2.2 cm. The wall was elastic and not more than 2 mm. in thickness at the arch. The common iliac arteries were not more than 4 mm. in diameter. The intimal surface was smooth.

The left lung weighed 230 grams. Crepitation was slightly reduced throughout. The pleural surfaces were wrinkled. The cut surfaces were meaty and slightly congested. The right lung weighed 400 grams. Crepitation was preserved throughout the upper lobe. The lower lobe showed a large area of consolidation along the axillary periphery, over which the pleura was stretched and bluish in color. The cut surface showed a solid area of dark red discoloration. The lower trunk of the pulmonary artery and its branches leading into this area were filled with solid coagulum.

The spleen weighed 150 grams. The capsule was smooth and tense. The pulp was grayish red and solid. The corpuscles and trabeculi were indistinct.

The liver weighed 1,350 grams. The capsule was slightly grayish and fibrous. The cut surface showed extensive hemorrhage about each of the lobular centers. The yellowish intervening parenchyma was swollen and cloudy. The gallbladder was distended with dark, viscid bile. The wall was thickened and fibrous. The serosa was fibrous and the mucosa showed prominent folds. No calculi were found in the bladder or the ducts.

The stomach and the intestines were grossly normal. The pancreas and the adrenal glands were likewise normal.

The right kidney weighed 120 grams; the left, 125 grams. The capsules stripped readily leaving smooth, dark red surfaces. The cut surfaces were dark red and showed normal markings. The ureters and the urinary bladder were normal.

The uterus and the adnexæ were normal in development and appearance. The uterine cavity contained a small amount of blood clot.

There was no appreciable enlargement of the lymph nodes. The thymus was not recognized.

The thyroid gland was slightly enlarged and filled with colloid.

The marrow of the right femur was fatty.

Blood culture was negative.

Diagnoses.—1. Hypoplasia of the aorta. 2. Cardiac hypertrophy and dilatation. 3. Thrombosis of the right auricle and left ventricle. 4. Embolism of the right pulmonary artery. 5. Infarction of the right lung. 6. Chronic passive congestion of the liver, spleen and kidneys. 7. Chronic cholecystitis. 8. Colloid goiter. 9. Right pleural effusion. 10. Pericardial effusion. 11. Ascites.

Microscopic Examination.—The myocardium was normal. No amyloid degeneration and fatty infiltration or degeneration were noted by special stains. There were no areas of fibrosis or recent inflammation. The muscle fibers appeared swollen and edematous. The mural thrombus along the left ventricle showed organization but no exudative inflammation. This was taken to be a terminal process. A slight fibrous thickening of the mural endocardium was present with an area, in one section, of subendocardial infiltration of monocytes and lymphocytes. The aorta showed a normal intima and media but rather prominent and engorged vaso-vasorum in the adventitia. No fatty infiltration was found in the intima.

Few of the arterioles of the lungs showed medial and intimal thickening or edema. An organized embolus of the pulmonary artery with consequent hemorrhagic infarction of the involved area was found. The vessel walls showed no amyloid changes. Areas of edema, patchy atelectasis and emphysema were present.

In the liver there was marked central necrosis and hemorrhage and atrophy of the cords with fatty infiltration in the necrotic area about the lobular center. The gallbladder showed chronic nonsuppurative cholecystitis. The spleen and the kidneys showed passive congestion. The breasts were normal. The mediastinal lymph nodes were swollen and edematous and showed diffuse extravasation and lymphoid hyperplasia.

Comment.—The patient was young, well developed and well nourished, but always had ap-

peared "anemic." The fatal illness may be definitely traced back to the "influenzal" infection two months and a half before death. The heart showed no clinical or physical signs of a valvular disease or hypertension. It showed a rapidly developing, diffuse enlargement (dilatation), rapid pulse and no murmurs. Signs of broken compensation with dyspnea, cyanosis, lowered blood pressure, gastro-intestinal disturbance and later, edema and bloody sputum, all pointed to no definite diagnosis. The possibility of toxic myocardium of an unknown etiology, a congenital cardiac lesion or a tumor growth, was ventured, clinically.

*Case 3.**—W. R., a white male thirteen years of age, who was admitted to the hospital at 7:15 a. m. for a nasal operation and died under anesthesia at 10:10 a. m. of the same morning. The patient was prepared for operation, a 1:1000 adrenalin pack was put in the nose at 8:15 a. m. Alkoform anesthesia was started at about 8:55 a. m. About two ounces of the anesthetic, representing about 10 c.c. of chloroform, had been used during the subsequent thirty minutes when the patient became fully anesthetized. Pulse and respiration were normal. Not more than 1 c.c. of 1:1000 adrenalin was then injected into the nasal mucosa, preparatory to operation. The patient became suddenly cyanotic, respirations stertorous and pupils widely dilated. Breathing soon stopped excepting occasional gasps, and the pulse ceased. Death was pronounced at 10:10 a. m.

The patient was somewhat overweight and overgrown for his age. He was fatty and flabby but athletically inclined. The day before admission, he underwent physical examination and was pronounced satisfactory to submit to general anesthesia. Blood pressure was normal, being about 112, systolic. Urinalysis showed one plus albumin but was otherwise negative. Hemoglobin was 76 per cent and leukocytes 6,650.

The patient had been in this hospital from June 10, 1930, to July 10, 1930, with chronic suppurative otitis media, right and left, and acute suppurative mastoiditis, left, for which simple mastoidectomy had been performed. He returned on September 2, 1930, and had a radical mastoidectomy done on his left mastoid under general anesthesia. He had been troubled with a deviated nasal septum and resulting nasal accessory sinusitis and continued infection of his ears.

Necropsy Findings.—The body was that of a well developed, well nourished, somewhat obese, young, white male, 178 cm. in length and approximately 160 pounds in weight. Rigor was absent. Slight degree of hypostasis was present in the dependent portions of the body. There was a diffuse cyanosis of the face but no edema or jaundice. The pupils were equal and 5 mm. in diameter. There was no external evidence of violence. There was a healed mastoidectomy scar in back of the left ear. The subcutaneous adipose tissue was abundant and about 1.5 cm. in thickness.

The peritoneal cavity contained no excess fluid. The appendix was retrocecal and adherent and 12 cm. in length and approximately 8 mm. in diameter. It showed no evidence of recent inflammation. The diaphragm was at the third rib on the right and the fourth rib on the left.



Fig. 7. Case 3. Heart, 300 grams. Hypertrophy and slight dilatation of the left ventricle with a narrow aortic orifice, 4.6 cm. in circumference above the valve.

The pleural cavities showed no adhesions and no fluid.

The pericardial cavity contained approximately 25 c.c. of reddish, amber fluid.

The heart was distended and weighed 300 grams (Fig. 7). There were small subpericardial hemorrhages. The myocardium was pale red and slightly softer than normal. The wall of the left ventricle appeared somewhat thickened. It was 18 mm. in thickness. The right ventricle was slightly dilated and the wall was approximately 8 mm. in thickness. The mural endocardium was smooth. The valves showed no disease. The root of the aorta showed a smooth intimal surface. The ascending portion of the aorta was approximately 1.5 cm. in diameter and 4.6 cm. in circumference just above the aortic leaflets.

The right lung weighed 225 grams; the left lung, 195 grams. Crepitation was preserved throughout. The cut surfaces were pinkish-gray in color and apparently entirely normal.

The spleen weighed 220 grams. The capsule was smooth. The pulp was dark red and somewhat soft and swollen. Malpighian corpuscles were numerous and prominent, some measuring about 1 mm. in diameter.

The liver weighed 1,600 grams. The capsule was smooth. The cut surface was pale brown in color and soft and cloudy. The markings were indistinct. The gallbladder was normal.

The stomach and the intestines were normal. The pancreas was normal.

*From the Otological Service of Dr. C. E. Connor.

The right adrenal showed hemorrhages in its substance. It was otherwise normal. The left adrenal was normal. The right kidney weighed 130 grams; the left kidney, 130 grams. The capsules stripped readily, leaving smooth, dark red surfaces. The cut surface was dark red and the markings were normal.

The urinary bladder was normal. The genital organs were normal.

The aorta was smaller than normal. The circumference above the bifurcation was 2.5 cm. There were numerous enlarged lymph nodes, particularly in the mesenteric chains, where they attained a size 2 × 1 cm. They were soft, meaty and evidently hyperplastic. Numerous lymph nodes were scattered throughout the mesentery and mediastinum and pulmonary hilum.

The thymus weighed 35 grams. A portion of it was found supersternally.

There was an area of ecchymosis over the skull over the left frontal area, about 2 cm. in diameter, without any discoloration of the scalp over it.

The brain was grossly normal, except for a slight congestion. The right mastoid consisted of somewhat sclerotic cells. No exudate was found. The left consisted of a large cavity communicating with the external meatus and a petrous portion still showing a few irregular cells bathed in greenish, purulent exudate.

Diagnoses.—1. Hypoplasia of the aorta. 2. Cardiac hypertrophy and dilatation. 3. Passive congestion of the spleen, kidneys and brain. 4. Fatty liver. 5. Chronic suppurative mastoiditis, left side.

Microscopic Examination.—The liver showed a marked atrophy of the liver cords with central hemorrhage, indicating a high degree of chronic passive congestion which strongly pointed to a cardiac decompensation of some duration. It also showed a moderate degree of fatty infiltration. The spleen and kidneys showed diffuse congestion; no arteriolar disease. The cardiac muscles showed no evidence of fatty change, fibrosis or any other degenerative process. The wall of the aorta was essentially normal. The lungs showed a slight degree of congestion. The lymph nodes showed a diffuse hyperplasia.

Comment.—Diagnosis in this case was based upon the finding of a relatively small caliber of the aorta for the size of the heart, which was distinctly enlarged for the age of the patient. This was further strengthened by the robust, athletic build of the individual. That the death was due to cardiac failure was substantiated by the microscopic appearance of the liver, which presented a high degree of chronic passive congestion. There was no valid basis to support the theory that the death was due to adrenalin or chloroform. On the other hand, a certain school of pathologists might readily explain the cause of death on the basis of the so-called thymicolymphatic constitution.

*Case 4.**—E. N., a male eighteen years of age, after running up three flights of stairs to a class room, collapsed and died suddenly at 8:36 a. m., November 6, 1931. On September 24, 1931, the boy underwent a physical examination at the Student Health Service, the record of which was essentially as follows: He had measles at two, scarlet fever at fourteen years of age; complained of occasional earache and discharge and nose bleed. He was subject to dizziness. He was 67.5 inches in height and 108 pounds in weight. He had gained twenty pounds in the last two years. Blood pressure was 122 systolic and 80 diastolic. Pulse was 77 per minute. His pulse rose to 112 after exercise and came down to 96 in two minutes. He gave a history of irregularity of heart beat and dyspnea following moderate exercise. He was described as asthenic in type.

The father wrote, in response to the inquiry, that "there was nothing in the boy's physical make-up to point to heart trouble during his lifetime except 'short windedness.' It was more noticeable while he was exercising in an upright position. He never exercised until completely worn out. During the past two or two and a half years, he seemed to be overcoming his difficulty. His two years' physical training at Junior College was no special effort for him. He never missed a day of school because of illness."

Necropsy Findings (by Dr. J. B. Clawson).—The body was that of a well developed, well nourished, white man, 174 cm. long and weighing about 140 pounds. Rigor was absent; body temperature was still present; there was a slight purplish hypostasis posteriorly; no edema or jaundice; grade two cyanosis in the lips and fingers. Each pupil measured 5 mm. in diameter. There was a small, superficial abrasion on the left elbow.

The peritoneum was smooth, glistening, and the cavity was free from excess fluid. The appendix was anterior and free. The diaphragm was at the fifth rib on both sides.

The pleural cavities were free from fluid and adhesions. The pericardium was smooth, glistening, and the cavity contained about 20 c.c. of clear fluid.

The heart weighed 435 grams (Fig. 8). The myocardium was very firm; the color was red. The ventricles stopped in systole. The hypertrophy was confined mostly to the left ventricle. The wall of the left ventricle was 23 mm. in thickness; that of the right was 9 mm. No changes were noted in the valves except that the aortic cusps were small. The circumference of the aorta at the level of the cusps was 4.5 cm.; the circumference of the entire aorta was proportionally small. The root of the aorta and the coronary arteries were smooth.

The right lung weighed 280 grams; the left, 250 grams. Both crepitated throughout and were free of nodular or consolidated areas. On section, the lungs were found to be of pinkish-gray color and showed feathery consistence.

*From the Student Health Service of the University of Minnesota.

The spleen weighed 130 grams and appeared to be of normal consistence. On section, no gross changes were noted in the pulp.

The liver weighed 1,335 grams. It was dark red. There was a considerable amount of blood in the liver but the centers of the lobules were not darkened. No



Fig. 8. Case 4. Heart, 435 grams. Marked hypertrophy of the left ventricle and a narrow ascending arch with a circumference of 4.5 cm. above the valve.

abnormalities were seen in the gallbladder, gastrointestinal tract, pancreas, or adrenals.

The right kidney weighed 120 grams; the left, 130 grams. The capsules stripped easily and left smooth surfaces. On section, no evidence of atrophy was detected in the cortices and the cortical markings were well preserved. The mucosa of the bladder showed a small amount of trabeculation. There was no enlargement of the prostate and no changes were seen in the seminal vesicles.

The abdominal aorta was smooth. There was no enlargement of the lymph nodes.

The scalp, cranium, meninges, and brain appeared entirely normal.

Diagnoses.—1. Hypoplasia of the aorta. 2. Cardiac hypertrophy.

Microscopic Examination.—The myocardium of the left ventricle showed a definite hypertrophy of the individual muscle fibers. The liver showed diffuse, cloudy swelling and edema—no passive congestion. Moderate congestion of the spleen, kidneys and adrenals. No sclerosis of the renal arterioles.

Comment.—There is a striking similarity between this case and Case 1. Doubtless the patient showed a well sustained circulatory compensation during his adolescence through an increasing hypertrophy of the heart. The sudden insult in the form of "climbing up a few flights of stairs" was sufficient to break this compensation. There was no microscopic evidence of cardiac failure which preceded the fatal termination.

SUMMARY AND CONCLUSION

Four cases of hypoplasia of the aorta terminating in death are reported. In each instance, autopsy disclosed a cardiac hypertrophy with relative dilatation, without any other demonstrable lesions except a small aorta.

Case 1, a robust young man of twenty-eight who showed a prolonged period (at least twelve years) of perfect compensation with a marked left ventricular hypertrophy, developed an acute fulminating decompensation following a severe physical strain and died within a week.

Case 2, a well developed young woman of twenty-three, who had always been pale, ran a subacute or chronic course of cardiac decompensation following an attack of "influenzal" infection and died in eleven weeks. She showed a rapidly increasing cardiac enlargement with progressive decompensation without signs of known organic heart lesions or hypertension.

Case 3 was that of an overgrown boy of thirteen who died during sudden insult occasioned by anesthesia. Physical examination, a day before, had been entirely negative. Post-mortem evidence indicated a pre-existing cardiac decompensation of unknown duration.

Case 4 was that of a young man of eighteen years who died suddenly after climbing a flight of stairs. The only information of pertinence was that he gave a history of irregularity of heart beat and dyspnea following moderate exercise and of being subject to dizziness.

In none of the four cases were congenital anomalies involving the genital apparatus, heart or any other visceral organs found.

The literature is briefly reviewed and diagnostic criteria are formulated from several of the authors.

Hypoplastic aortas which cause no cardiac symptoms have been encountered from time to time, in our routine autopsy practice, only to be overlooked or disregarded by the examiner. No plausible explanation has been advanced for the evident dilemma that whereas a group of cases showing a hypoplastic aorta manifest definite cardiac symptoms or die of sudden heart failure, many others evidently show no signs of cardiac involvement.

In the light of our present knowledge, it would seem reasonable to state that there is a sufficient basis for assuming, until otherwise proven, that hypoplasia of the aorta may be a major factor

in the causation of cardiac hypertrophy and subsequent sudden failure and death in young, robust individuals who show no other demonstrable lesions at autopsy.

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ACUTE VASOSPASTIC HYPERTENSIVE DISEASE WITH TRANSITION INTO MALIGNANT HYPERTENSION: FINAL REPORT OF A CASE WITH NECROPSY*

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THIS case was previously reported at both the 1930 and 1931 meetings of the Southern Minnesota Medical Association. Since then, the patient has died, and necropsy was performed by one of us (Beaver), the report of which constitutes the basis for this paper. A brief review of the history and previous clinical observations are given, for they are apparently confirmed by the postmortem studies.

This patient had had a severe, acute infection of the throat about January 1, 1930. At that time he was twenty-nine years of age. About two months later he came under our care, complaining of attacks of extremely severe abdominal cramps, very severe headaches, and typical attacks of angina pectoris, all of which had been transiently relieved by nitroglycerine, which the patient had begun to take shortly after the onset of the symptoms. At the time of his first examination by us his blood pressure in millimeters of mercury was 180 systolic and 140 diastolic. There was no evidence of nephritis. The urine was normal. The intake and output of fluid balanced well. Blood urea determinations were normal, and phenolsulphonphthalein was excreted in good concentration. The eye-grounds were clear of exudates and hemorrhages. The retinal vessels, however, were slightly narrowed, but definite sclerosis was not noted. Diagnosis was made of acute vasospastic hypertensive disease. A great deal of improvement of symptoms followed. About a year after the onset of the disease the patient had gained about 40 pounds

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(about 18 kg.) and felt fairly well. He had practically no pain, and was able to walk four or five miles slowly without special fatigue. The blood pressure at this time was, however, 200 mm. of mercury systolic and 150 diastolic, and the urine contained some albumin, with a few hyaline and leukocytic casts. The vessels of the retina were irregular and notched, but still there were no signs of exudate, hemorrhage or edema of the disks.

About four months later, however, examination revealed retinal changes typical of malignant hypertension. At this time, definite enlargement of the heart and high grade arteriosclerosis were easily demonstrated in the peripheral and retinal vessels. In a microscopic study early in the disease of a piece of pectoral muscle, the arterioles were wide open but there was a little early proliferation in the walls. A second biopsy, made about twenty months after the onset, revealed marked proliferative changes, with complete closure of some of the arterioles. At this time also there was for the first time demonstrable evidence of renal insufficiency. Progression of the arteriolar disease and hypertension continued until the patient died of combined cardiorenal and vascular insufficiency, about two years after the onset of his illness. Table 1 (previously published) gives an outline of the clinical data.

TABLE 1. ACUTE VASOSPASTIC HYPERTENSIVE DISEASE (TRANSITION INTO TYPICAL MALIGNANT HYPERTENSION)

Date	Urine				Blood			Blood pressure, mm. mercury		Heart			Arteriosclerosis				
	Albumin, grade	Blood, grade	Casts, grade	Phenolsulphonphthalein, per cent, 2 hours	Anemia	Urea, mg. per cent	Serum sulphates, mg. per cent	Systolic	Diastolic	Hypertrophy, grade	Significant electrocardiographic changes	Gallop rhythm	Radial, grade	Retinal, grade	Retinitis	Muscle biopsy (arteriolar study)
2-21-30	0	0	0	Normal	0	Normal		180	140	0	Yes	Yes	0	0 some slight constriction	0	
4-26-30	0	0	0					170	120					0		
Apr. 1931	Some	0	Some		0	Normal		200	150					1 to 2	0	
7-29-31	2 to 3	0	0 to 1	45 per cent	0	20	6.03	225	160	1 to 2	Yes	Yes	1 to 2 3	2 to 3	Typical malignant hypertension	Wall to lumen ratio 1:1; marked increase in intimal and medial nuclei; some arterioles completely closed, proliferation
12-19-31	Patient died; necropsy performed															Normal wall to lumen ratio; some proliferation of both intimal and medial nuclei

Necropsy was performed twenty-four hours after death. Cavity and vascular embalming had been done.

Macroscopic features.—Extreme emaciation was present, although the lower extremities were markedly edematous. The fluid content of the peritoneal cavity could not be estimated because of the cavity embalming. The left pleural cavity gave off a gush of air as it was opened. It contained a large quantity of purulent exudate with a putrid odor, and except for its sites of adhesions, the pleura was covered by thick fibrinopurulent, partially adherent exudate. Throughout the upper lobe of the left lung were multiple, large and small, sharply circumscribed, hemorrhagic and grayish regions of consolidation. One of these areas presented frank suppuration, with necrosis of the surrounding pulmonic tissue. This had perforated into the left pleural cavity, giving rise to pyopneumothorax. The portions of the left lung, not involved by these changes,

were collapsed. Multiple thrombi were present in the pulmonary arteries, especially those which led to the regions of consolidation. The right visceral and parietal pleural surfaces were partially covered by fibrinopurulent exudate. The lower portions of the upper and lower lobes of the right lung were consolidated. These regions of consolidation were sharply circumscribed and hemorrhagic. Thrombi were present in most of the branches of the right pulmonary artery. The transverse pericardial measurement was 15 cm. The visceral pericardium was sparsely covered by fibrinous exudate, which gave it a shaggy appearance. The heart weighed 525 gm. The chambers of the heart were dilated, and on the endocardium of the right auricle and right and left ventricles were firmly attached mural thrombi, some with central puriform softening. The valves were normal. The coronary arteries were sclerosed to a moderate degree.

The spleen weighed 250 gm. It revealed only moderately severe congestion and small regions of anemic infarction. The liver weighed 2,100 gm. Its capsular and sectioned surfaces revealed the nutmeg mottling of passive congestion. In the right lobe was an encapsulated hematoma measuring 7.5 by 4 cm. Many of the larger hepatic arteries contained thrombi. On the anterior surface of the left lobe there was a deep fissure with puckered borders, and a fibrous scar at the base. On the posterior wall of the duodenum, 1 cm. below the pylorus, there was an ulcer 0.8 cm. in diameter with a clean, dense, thickened base. The crater of the ulcer penetrated into the duodenal submucosa. The remainder of the gastro-intestinal tract appeared normal.

In the pancreas there were multiple, small grayish, necrotic foci. Both suprarenal glands were densely encapsulated by fibrous connective tissue. The medullary substance was relatively large in amount, with corresponding relative thinning of the cortex. A small amount of hemorrhagic extravasation was present in the medulla of both glands. The kidneys together weighed

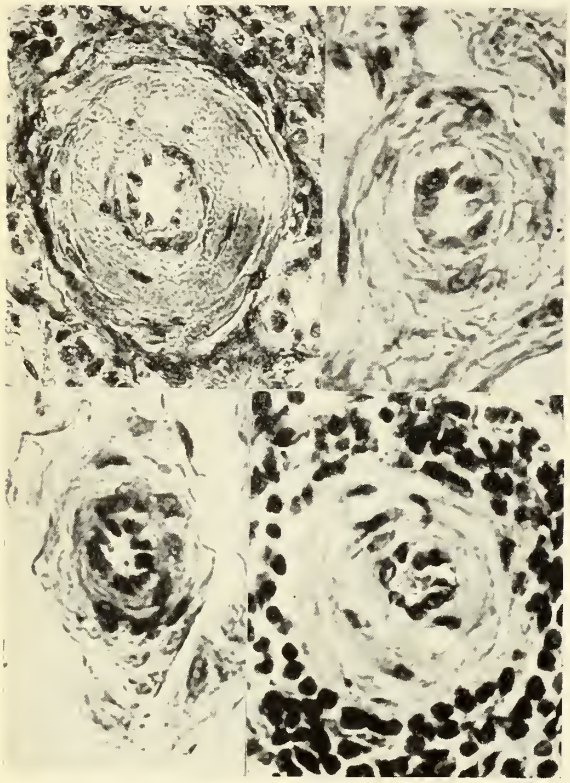


Fig. 1. Arterioles from four anatomic situations (upper left, kidney; upper right, liver; lower left, pectoral muscle; lower right, spleen). Reduction of the caliber of the lumen is evident in all.

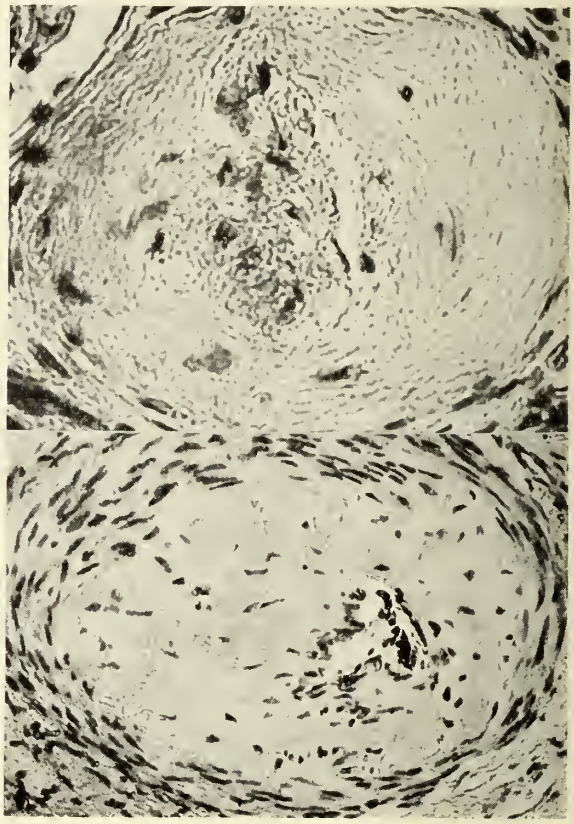


Fig. 2. Renal arteries. Hypertrophy and increased cellularity of the media. Intimal proliferation and narrowing of the lumen. Hyaline changes are seen in both intima and media.

200 gm. They were covered by dense fibrous tissue capsules which could not be stripped without tearing the renal substance. Throughout the fibrous tissue of the capsules a considerable quantity of dark brown pigment was revealed. The cortical surfaces of the kidneys were granular, and contained a number of relatively deep pits and scars. Cortical and medullary markings were obscure. The cortexes were, on an average, 0.6 cm. thick, and the medullas 1.2 to 1.5 cm. thick. A recently formed thrombus occluded the left renal artery. The pelves of the kidneys, the ureters, the bladder and the prostate gland revealed no pathologic changes.

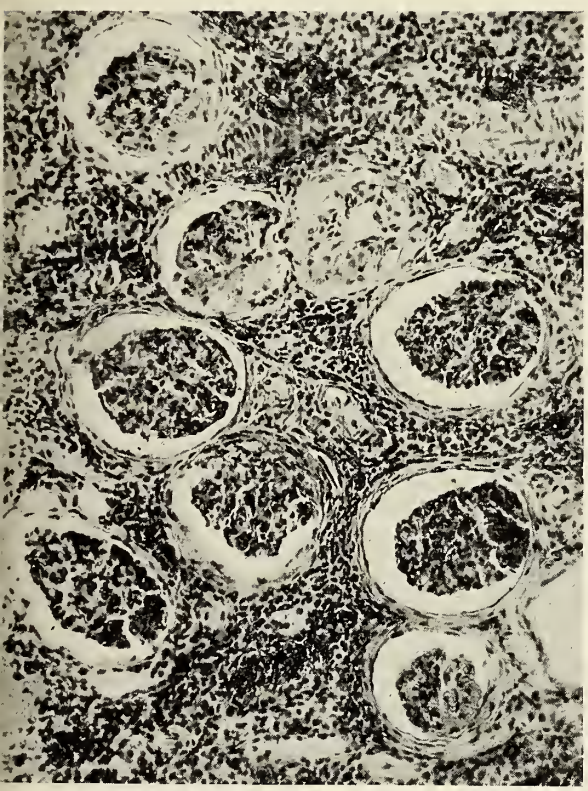


Fig. 3. Increased cellularity, thickening of capillary basement membranes and hyaline foci are revealed in the glomeruli. Tubular atrophy with replacement by connective tissue is also shown.

Microscopic features.—Sections of the tissue were fixed in Orth's fluid, embedded in paraffin, and stained with hematoxylin and eosin. The van Gieson connective tissue stain and scharlach r were employed in selected instances.

The myocardium revealed hypertrophy of muscle fibers, within which there was a moderately severe grade of lipoid change. The mural thrombi of the heart were partially organized. Centrally, the clots contained semifluid débris. Sections of both right and left lungs revealed evidence of fibrinopurulent pleurisy, hemorrhagic infarction, and bronchopneumonia. Emboli were present in many pulmonary arteries. In some regions of the left lung suppuration had progressed to formation of abscesses. This was particularly true in the region of spontaneous perforation, in which pulmonary gangrene, on the basis of infarction with secondary suppuration, was evident. The liver presented the typical changes of chronic passive congestion. Sections from the hepatic hematoma revealed that it was surrounded by a thick, fibrous capsule, throughout which blood pigments were abundantly deposited. Connective tissue organization of the peripheral portion of the blood coagulum was fairly well advanced. Many small and medium-sized branches of the hepatic artery were occluded, some by organized thrombi, others by more recently formed to fresh thrombi. The base of the deep fissure which existed in the left lobe was composed of scar tissue. In this zone organized thrombi were usually found to occlude the branches of the hepatic artery. The spleen re-



Fig. 4. Relatively normal glomeruli and tubules alternating with regions such as are revealed by Figure 3.

vealed extreme sinusoidal engorgement, with relative atrophy of lymphoid tissue, and multiple, small areas of infarction. In sections of the pancreas were multiple foci of necrosis. About these were collected a small number of polymorphonuclear leukocytes. The renal capsules were markedly thickened. Throughout the capsules were deposits of blood pigments. Marked parenchymal atrophy existed in the subcapsular cortical zones. Throughout the remainder of the cortexes there were zones of relatively normal tubules and glomeruli, alternating with portions revealing varying degrees of glomerular injury and parenchymal atrophy. The changes in the arterioles and arteries of medium size were extreme; there were hypertrophy of the media and proliferation of the intima, resulting in loss of caliber of the lumens of the vessels. In some vessels the lumens were completely obliterated. Hyaline foci were common in the thickened media or intima. Lesser glomerular reactions consisted of increase of nuclei of the glomerular tufts, together with thickening of the capillary basement membrane. Progressive reactions resulted in focal hyaline changes within the glomerular tufts. In late stages the glomeruli were completely hyalinized. It appeared that the glomeruli were affected to about the same degree in any given part of the cortex, corresponding to the lobular arterial divisions of the kidney. Convoluted tubules revealed atrophic changes with replacements by fibrous tissue corresponding in degree with the severity of the adjacent glomerular injury. In the fibrous tissue there were always associated foci of lymphocytes. The suprarenal glands revealed relatively thickened medullary zones, intensely chromaffin reactive. The cortical cells were pale and contained lipoid. In some sections, recent extravasation of erythrocytes existed in the medulla.

Special emphasis was placed on a study of small arteries and arterioles obtained in sections of the skin, pectoral muscles, myocardium, thymic tissue, liver, spleen, pancreas, kidneys and prostate gland. In all instances a decreased caliber of the lumen of the vessel was observed. In the smaller vessels the narrowing of the lumen appeared to be almost entirely the result of hypertrophy of the media, but also, in more advanced cases, with proliferation of the intima. In larger arteries, especially in the kidneys, the intimal proliferative reactions were more advanced, and apparently contributed greatly to the narrowing. In extreme instances of narrowing of vessels, hyaline changes were observed in the thickened media and intima of the vessels. The ratio of wall to lumen was usually as great as 1:1, with, not uncommonly, more marked thickening of the wall, especially in the smaller arteries and arterioles of the kidneys and spleen, in which complete obliteration of the lumen of the vessel was common.

Anatomic diagnosis.—1. Hypertrophy of the heart (525 gm., normal 300 gm.; malignant hypertension observed clinically) with dilatation graded 3, and mural thrombosis in the right auricle and in the right and left ventricles. 2. Subacute adhesive pericarditis. 3. Arteriosclerosis of the aorta graded 2, of the coronary arteries graded 1, and of the arterioles graded 3. 4. Atrophy of the kidneys (200 gm., normal 300 gm.), with multiple scars (arterio-arteriolar sclerosis). 5. Pulmonary embolism (source, right side of heart), with multiple bilateral infarcts and formation of abscesses in the left lung. 6. Pyopneumothorax on the left side with spontaneous perforating abscess. 7. Organizing bronchopneumonia. 8. Old and recent thrombosis of the intrahepatic branches of the hepatic arteries, with organizing hematoma in the right lobe of the liver. 9. Recent thrombosis of the left renal artery. 10. Chronic passive congestion of the liver. 11. Edema of the lower extremities and genitalia graded 3. 12. Hypertrophy of the spleen (250 gm., normal 150 gm.) with passive congestion and infarction. 13. Perirenal and perisuprarenal hemorrhages, old and recent. 14. Multiple foci of fatty necrosis in the pancreas. 15. Subacute perforating duodenal ulcer. 16. Emaciation, with decrease in weight from 180 to 120 pounds (81.5 to 54.4 kg.).

COMMENT

This case afforded a most unusual opportunity for study of acute, vasospastic hypertensive disease, with termination as diffuse arteriolar sclerosis. The principal clinical findings were clearly set forth in a previous paper. Although there was no opportunity for us to see the patient during the latter part of his illness, his physician at home offered the following few additional clinical features observed during this period. The patient had much severe abdominal and thoracic pain which could not be controlled adequately

with morphine. Marked dyspnea and also much nausea and vomiting were present, and edema of the lower extremities developed. The terminal illness was characterized more by profound cardiac decompensation than by uremia. The distinctive clinical features of the case, as previously summarized, are recapitulated here, as further aid in correlating the clinical with the pathologic findings: (1) development of malignant hypertension with albuminuria and early renal insufficiency came as a result of vasospasm and arteriolar injury, and not as a result of primary glomerulonephritis; (2) marked arteriolar involvement was proved by study of biopsy of pectoral muscle; (3) vasospasm was the chief factor at the onset, and preceded demonstrable significant arteriolar disease; (4) the diffuse vasospasm involved arteries as well as arterioles, as suggested by the angina pectoris and abdominal crises, although the probability is that angina pectoris in cases like this is not all due to coronary spasm but also to acute cardiac strain, and (5) the history of the onset suggests acute tonsillitis probably of streptococcic origin as the chief etiologic factor.

The existence of severe arterial disease was confirmed at necropsy. Advanced occlusive changes existed in many of the arterioles examined. The arteriolar changes appeared to be primarily the result of hypertrophy of the media of the vessels, but also with intimal proliferation and finally, in some instances, thrombosis. That these vascular disturbances were progressive is disclosed by the two biopsies of pectoral muscles taken at varying intervals, and finally by the changes as revealed by the vessels at necropsy. Narrowing of the vessels as a result of vasospasm was evidently the first demonstrable clinical change. This was followed by hypertrophy of the media of arterioles and smaller arteries, and finally by intimal proliferation and thrombosis, with occlusion of the lumens of many of the vessels. Throughout these stages, hypertension was a clinical manifestation, and appeared to progress in direct ratio with the severity of the vascular lesions. As a result of hypertension, compensatory cardiac hypertrophy supervened.

The heart had attained a weight of 525 gm. at the time of death. As a result of progressive vascular occlusion, the kidneys became involved in ischemic atrophy, and weighed approximately 100 gm. each at the time of the patient's death.

Evidences of myocardial failure and extreme vascular occlusive phenomena with multiple thrombi were the outstanding features in the terminal stages of the illness, as revealed by necropsy. The cardiac muscle had suffered degenerative change which prepared the way for dilatation of the cardiac chambers, allowing mural thrombosis to occur. The lungs became extensively infarcted, and secondary pulmonic infection supervened, as revealed by bronchopneumonia, formation of abscess, gangrene, and pyopneumothorax. Effects of the passive congestion were further disclosed in the liver, which was extremely congested, and in edema of the lower extremities. Thrombosis of the hepatic arteries following extreme passive congestion of the liver undoubtedly had given rise to the unusual picture of hepatic infarction, with hematoma, necrosis, and scarring. This factor, added to perirenal hemorrhage, hemorrhage about the suprarenal glands, thrombosis of the left renal artery, infarction, pneumonia, formation of abscesses in the lungs, and empyema, had no doubt succeeded the vasospastic phenomena as the cause of severe abdominal and thoracic pain in the terminal phases of the illness. Multiple thrombosis of arteries, revealed at necropsy, is unusual, and evidently is dependent on alterations of the vascular walls in association with failing cardiac compensation.

In the early stages of the illness the hypertensive phenomena appeared without clinical evidence of renal impairment, and, as the illness progressed, although renal injury became clinically apparent, there remained a great disproportion between the renal findings and the severe degree of hypertensive disease. Only in the terminal phases of the illness did renal failure become an important factor. Never did it appear to occupy a place of first importance, and to have progressed to the point of producing clinically evident uremia. In the previous report of this case, diagnostic criteria were enumerated, which then, as now, seem to justify our considering this case as an illustration of vasospastic and diffuse arteriolar hypertensive disease rather than of glomerulonephritis. These diagnostic features were: (1) persistently normal urine, for a prolonged period at the onset, (2) normal results from tests of renal function, (3) absence of edema, and (4) absence of anemia. When renal injury became clinically apparent, the hyperten-

sive disease, with associated characteristic vascular and cardiac changes, was well advanced. A diagnosis of primary glomerular nephritis would hardly be tenable in the face of such findings.

Necropsy gave additional proof that we were not dealing with a case of primary glomerular nephritis. The glomerular lesions were not diffuse, such as are characteristic of glomerulonephritis. Zones of relatively normal glomeruli and tubules alternated with zones revealing varying degrees of pathologic change. The glomerular lesions were usually less severe than those exhibited by the arterioles and smaller arteries of the kidneys. The glomerular injury appeared to be of relatively the same degree in the representative glomeruli of the same zone of renal cortex. Differing zones of glomeruli revealed varying degrees of renal injury, thus corresponding in degree to the severity of the vascular occlusive phenomena of a given region. Typical glomerular crescents, as seen in glomerular nephritis, were not revealed. Collections of lymphocytes appeared only in the scar tissue of the atrophic portions of the renal parenchyma. The lesser glomerular lesions disclosed increased cellularity, with thickening of the capillary basement membrane. In later lesions zones of hyaline material appeared in the tufts, and end stage lesions revealed complete hyalinization of glomeruli. Tubular atrophy and replacement of connective tissue corresponded in degree to the completeness of the glomerular condition.

SUMMARY

An unusual case of acute vasospastic disease, terminating in malignant hypertension, has been presented. The report is of additional value, since it was possible to follow the course of the patient's illness from its inception until the end, with, finally, necropsy. The onset of symptoms followed acute tonsillitis probably of streptococcic origin. Vasospasm was the chief factor at the onset of illness and preceded demonstrable arteriolar disease or nephritis. By successive studies made from specimens removed at biopsy and at necropsy, the end-result of the disease has been revealed as diffuse arteriolar sclerosis with cardiovascular and renal failure.

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SPONTANEOUS PNEUMOTHORAX*

REPORT OF CASE

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SPONTANEOUS pneumothorax is encountered frequently by internists dealing with pulmonary tuberculosis, but is rarely seen by the average general practitioner. The term, spontaneous pneumothorax, signifies the presence of air in the pleural cavity and is descriptive of that type of pneumothorax which occurs without any appreciable provocative cause in an apparently normal individual. It is the same as idiopathic pneumothorax.

This idiopathic group is small, and it must include only those cases in which no known cause for the pneumothorax can be demonstrated. In this group the etiologic factor is thought to be the bursting through the pleura of an emphysematous bleb, which has been formed by the gradual but continual undermining of the pleura by air escaping from a ruptured air vesicle, or possibly through a direct tear in the pleura which has been caused by the tug of an adhesion. The actual rupture of the air vesicle may have occurred a long time before the onset of symptoms. This rupture could be caused by some incident in which the intrapulmonic pressure was suddenly and greatly increased. That normal tissue of the lung is susceptible to rupture when put under

*Read at the meeting of the Southern Minnesota Medical Association, Rochester, Minnesota, September 12, 1932.

great strain is evidenced by the report of rare instances of pneumothorax in parturition, heavy lifting, playing football and during violent paroxysms of whooping cough.

There are three types of pneumothorax: (1) closed; (2) open, and (3) valvular. The valvular type is practically always the one present in the spontaneous form, because in this type the pulmonic pleura is perforated, the lung collapses, and the tissues in the vicinity of the tear act as a flap or valve. Thus air enters the pleural space easily, but is hindered in its attempt to return to the bronchial system. Air will pass through the flap into the pleural cavity so long as the intrapleural pressure at the height of inspiration is less than that of the intrabronchial pressure at the same time. In this way the intrapleural pressure during inspiration is the same as atmospheric pressure.

The case I present is one of the valvular types of spontaneous pneumothorax.

REPORT OF CASE

The patient, a young man, twenty-one years old, was born in Fillmore County, Minnesota, of Norwegian parents. He had been unusually free from the usual indispositions, fevers, and so forth that most children have during early life. In his early history the only incident which seemed to have any bearing on the case was the fact that the patient had often had the "wind knocked out of him." He had been an unusually rugged boy up to about four months previous to the onset of this attack of pain in the thorax when he had been operated on by Dr. Cabot at the Colonial Hospital, Rochester, for a hydronephrosis of the left kidney due to a congenital malformation of the ureter. This was not tuberculous hydronephrosis.

About 6:00 a. m., January 28, 1931, while stooping over to pull on his overshoes, the patient was seized by a very severe and sickening pain in the left upper portion of the thorax. There was no special exertion connected with this act except for the bending over of 6 feet and 4 inches of a young man. As he was planning to do chores, he put on his coat and cap and started for the barn, but, when he had gone about 50 feet from the house, the pain and dyspnea became so severe that he retraced his steps, and with considerable effort returned to the house.

About fifteen hours after the onset of pain, after the usual home treatment failed to give relief, I was called and the following picture presented itself. The patient had no fever. Respiration was rapid, 38, and there was no respiratory movement on the left side of the thorax. On percussion, the left side was hyperresonant, almost tympanitic. The apex beat of the heart was dislocated to the right side. On auscultation, there was not a sound to be heard over the entire left side of the chest. Vocal fremitus was absent. The right side was also slightly hyperresonant, but the breath sounds were increased and the voice sounds also.

Morphine was administered but gave relief for only six hours, when I was again called. The condition of the patient was very much the same as on the former visit except for some dullness at the base of the left lung. The apex beat seemed to be pushed still further over to the right side. At this time I decided that this was a hospital case, and on the evening of January 29 the patient was brought to the Colonial Hospital, Rochester, where he was taken care of by Dr. S. W. Harrington. Search was made there for tuberculosis or evidence of healed tuberculosis with negative results.

COMMENT

There are several points to be considered in making the diagnosis of spontaneous pneumothorax in this case: (1) The fact that the patient had been an active athlete, played basket-ball and learned to ski about the same time as he started school, and in his own words "had had the wind knocked out of him many times" may be the reason for a weakened structure of the lung (a broken air cell which finally broke through the pleura at this time could easily have been sustained from one of these falls); (2) there was no history of illness during the growing period until the operation for nontuberculous hydronephrosis; and (3) all tests for tuberculosis were negative including roentgenograms of the thorax for the usual remnants of a juvenile tuberculosis. With these points in mind, it seems fair to call this a case of idiopathic penumothorax.

HAZARDS OF IODIZED OIL INJECTIONS

It has been ten years since Sicard and Forestier introduced into medical practice the iodized oils as diagnostic agents. These appeared to offer great possibilities in the localization and definition of certain lesions in the cavities of the body. Occasionally incidents have been reported showing that the injection and retention in the body of these oils are not without danger. In a recent issue of THE JOURNAL, December 3, 1932, p. 1946, appeared a report of the Council on Pharmacy and Chemistry dealing with the dangers of the injection of iodized oils. The report emphasized anew the necessity for a policy which has guided the Council in its deliberations over the past quarter of a century; namely, that of insisting on due caution in the use of all new methods and preparations until their potentialities for doing damage have been subjected to the test of scientific scrutiny. (Jour. A. M. A., January 7, 1933, p. 46.)

PRACTICAL DIABETIC DIETS*

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A REVIEW of American diets, whether for disease or as epochs in the evolution of civilization, is an interesting study. This is especially true of carbohydrates. It has been estimated that in 1823 each person consumed about 8.8 pounds of sugar a year. At that time, because of its cost, it was used principally as a condiment. In 1930 the human consumption of sugar was 108 pounds per person. This difference is about 450 calories a day. Today sugar has become so important an item in our diet that nearly one-sixth of our energy comes from this source. We have even attempted to refine our carbohydrates to such an extent that many of the necessary elements have been removed. As you know, many diseases due to the lack of vitamins have been attributed to this. Polished rice and milled cereals, such as white flour, breakfast foods, and corn starch, are such articles.

Recently we have seen the scientist swing the pendulum back to roughage and unrefined products in order to hold these properties. Through advertisements there is no housewife who does not think vitamins and roughage are necessary in the household diet. These items have become a fad in our daily habits, whereas a few years ago we talked in terms of calories. We have forgotten the pioneer American demanded meat dishes. Mendel has stated that if you look over hotel menus of 1850 you will likely find two choices of meat soups, two of fish, twelve of meat (six boiled and six roasted dishes), with only ten vegetables and four desserts. But gradually during these eighty years we have desired more desserts, and, typical of the American slogan of the go-getting Yankees, we got what we wanted. It is peculiar how closely this has been attached to success, and the less the financial embarrassment in this country the more we have demanded sweets. Today no American meal is complete without either ice cream, pie, cake, or éclairs.

It is only necessary to travel in England or on the continent to note the difference in the desires between the average European and American table. Protein is still their main article of diet. Housewives in our country, as a rule, provide a diet of three-fifths carbohydrate, one-fifth protein, and one-fifth fat, giving enough vitamins and roughage to care for our needs in other elements besides calories. Thus the American diet has changed from excessive protein to excessive carbohydrate in recent years. Since the war we have seen another wave of enthusiasm for the so-called obesity diets. This has been deemed necessary by dictates of fashion, and round curves have been changed to angular ones. The American idea of beauty demanded a slim body. Compare that idea with the standard of body beauty among the South Africans and the Eskimos.

Today through advertisements we are beginning to leave the low caloric diet, and vitamins have been pushed somewhat in the background. We are beginning to take a stand midway between the two extremes.

This same changing picture is just what has occurred in the treatment of diabetes in this same period. A few years ago we talked about high fat diets, thinking we had reached the height of success in the treatment of this disease. Within the last year certain medical scientists have advocated the other extreme, or high carbohydrate, low fat diet. A doctor is an individual trying to serve, as does the housewife, in reaching some sense of perfection. We cannot criticize him for his changing ideas when we consider how much we have changed the diet of the so-called healthy individual during this period. As the result, all individuals of the last fifteen or twenty years, whether ill or well, have seen a marked change in food requirements. There is no field in which opportunity for dogmatism and quackery is so prevalent as in the domain of our daily diet.

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Since 1914 we have seen the diabetic diet become more liberal in total calories. Then modified starvation in some form was used. The severe diabetic patient was still a pathetic individual. Our only attempt to keep him alive was with a low caloric diet which was supposed to lower his basal metabolic rate. In the end, acidosis was our greatest enemy. Early in 1920 Newburgh and Marsh came forward with some new ideas which brought to our attention the high fat, low carbohydrate diet. This diet allowed the patients to put on weight, and they again became normal looking human beings. There were certain features of this regime which were questioned for quite a period of time. Through the careful work of Wilder on severe diabetic patients it was shown that many of Newburgh's ideas were correct. Wilder definitely determined that the protein intake in the diabetic was a factor that regulated the basal metabolic rate of the individual. In other words, by increasing or decreasing the amount of protein in the diet we could increase or decrease the metabolic rate of caloric consumption. He also found that under rest, and enough calories from carbohydrates and fats, two-thirds of a gram of protein was sufficient to maintain nitrogen balance. Most adult patients, exercising in the usual manner, use about one gram of protein.

Woodyatt had also determined previously that there was a certain amount of glucose necessary to combust the fatty acid radicals under severe acidosis. This ratio was about 1 or 1.5 to 1, but by prolonged treatment, after the diet was established, we could use a higher ratio of 2 or 2.5 to 1, and still not have acidosis occur. As a result the high fat diet gave the diabetic patient an opportunity to keep himself around a normal weight for his height and age. Today many diabetic individuals appear as robust and healthy as normal people.

About this time insulin was brought forward by Banting. This again changed our method of dieting, and especially helped the severe diabetic patient who could not live with any material happiness on the high fat ratio that was present in the old diet. With insulin the longevity for these unfortunate individuals was increased to nearly a normal period of life. As a result over the last seven to eight years our diabetic patients have been accumulating in the world, and many have reached an age in life where death would normally occur. Cardiovascular complications are usually present in these individuals at the time of their death. Joslin has shown that before the introduction of insulin acidosis caused 85 per cent of the deaths of diabetics. Today it accounts for only 10-20 per cent. Many deaths are said to be due to diabetes, when really it is only the contributing factor to the final cardiovascular accidents that occur in these individuals. Many times these individuals reach three score years and ten, and their death comes from natural causes not directly associated with diabetes. Since diabetes is one of the diagnoses given on the record we have a rather confusing picture in mortality statistics.

After the introduction of insulin, we gradually increased the amount of calories these patients were allowed, usually allowing more carbohydrates, which in turn gave a low ratio between the glucose and fatty acid radicals. There have been levels arbitrarily established for these individuals. Joslin, for example, is in the habit of allowing usually between 100-125 grams of glucose in the diet, giving enough insulin to cover the necessary requirements. He has always been more careful to keep a lower fatty acid glucose ratio than have other diabetic clinics by not allowing the patient's diet to become greatly restricted in carbohydrates. He claims this has been a definite factor in keeping them on their necessary diet without periods of over-eating. During the last few years Sansum and Rabinowitch and their workers have gradually increased this amount of carbohydrates, and have allowed diets consisting of somewhere around 200-300, or even more, grams of carbohydrates daily. This has made it necessary for the patient to use a larger amount of insulin to cover this increased carbohydrate intake. Much to our surprise the amount of insulin required was not doubled as the amount of carbohydrates was correspondingly increased. Sometimes on a markedly higher carbohydrate diet the insulin has only been increased 30-40 units. This is one factor which has given the physician the impetus to use higher carbohydrates than necessary to maintain caloric and nitrogen balance. In the end it returns to the regime that is now present among the American people of using a high carbohydrate diet. There are certain features of this diet which I shall discuss later in this paper.

Therefore, reviewing the diets that have been

used during this period, we see that a high fat, low carbohydrate diet is one extreme; another extreme is a high carbohydrate, low fat diet which is very much in vogue in certain diabetic centers at the present time. This leaves someone to advise a high protein diet as the best regime, and this has been done by Porges of Vienna. There are certain features in a high protein diet which are not as desirable in the United States as in Europe. It is more the diet of the pioneer American fifty to seventy-five years ago and of the European countries at the present time. For that reason it probably is the desired diet for certain types, groups, or races, but in this country it is not particularly desirable. Most Americans prefer to live on a low protein intake. This they have done of their own accord, as discussed in the early part of this paper. The average American desires a high carbohydrate intake. If a larger amount of protein is used, we are going to have an increase in the metabolic rate of the individual, which demands more calories and a larger amount of insulin. If these factors are kept in mind it is probably of no greater harm to the individual than our high carbohydrate diets mentioned above.

This gives somewhat a review of diabetic diets over the same period in which we have seen changes in the diet of the healthy individual. It is surprising how closely the two coincide. Of course the diabetic is becoming a normal individual with the use of insulin, and naturally he is going to follow in the footsteps of his healthy associates.

As a result we have become neglectful of two facts in the treatment of these individuals. First, there is a waste of calories in order to satisfy a desire, or because of a lack of stamina to follow the principle and treatment we know are best for this group of patients. Second, there is the financial loss due to the large amount of insulin used. In this period of depression it is an important factor in budgeting the poor man's income. Patients in the dispensary of the University Hospital are complaining of this condition. During the last year the high carbohydrate diets were used in the hospital. These patients were many times allowed to return to their homes on a diet between 200-300 grams of carbohydrates, and necessarily larger amounts of insulin. Within a few weeks they were seen in the dispensary. Their cry was the enormous amount of money that had to be expended to keep them on their diet.

If patients are going to use indiscriminate amounts of insulin there are other dangers that have to be considered. The larger the amount of insulin taken, the more shock to the system if it is suddenly discontinued. Very often we see this done with disastrous results in reliable institutions where a patient's insulin is suddenly cut from a high amount to a very few units per day. This is especially true if the patient is running a temperature, seriously ill, or taking little or no food. When the patient has an acute respiratory infection, whether a cold or pneumonia, the insulin is more important than the amount of food ingested. We have all seen reliable physicians discontinue insulin during periods of serious illness or injury. This has increased the acidosis to such a great extent that the patient's death was not due to the severe condition that brought him to the hospital. Patients on a lower diet and less insulin are less apt to develop this condition.

After adjusting their diets to a lower carbohydrate intake some of these individuals have become sugar-free without insulin but still are allowed 125 grams of carbohydrate intake daily. Many of these individuals have had to apply to county and public relief for financial help. It seems to me this money could be used to a better advantage if it were spent for more desirable food rather than for insulin. Individuals in the upper stratum of life also have complained of the expense, and have found they are getting more carbohydrates than they desire. They feel stuffed and uncomfortable; they are making more or less the same complaint that a patient did a few years ago on a high fat diet. Regardless of whatever injury this diet might cause, I feel it is not practical from an economic standpoint. Of course I do not mean these individuals should be allowed to lose weight by restriction of total calories, but a relatively higher amount of fat could safely be used in their diets with a restriction in the carbohydrate intake and a smaller amount of insulin.

Many elderly diabetic patients are apt to ask for a diet which will not necessitate the use of insulin. There are certain factors in the treatment of elderly individuals which make it desirable not to keep them too low in glycosuria, or blood sugar. It has been stated by Joslin that years ago in his over-zealous enthusiasm he felt

he had brought about a sudden death of an elderly diabetic. The patient being put on a markedly restricted diet, became sugar-free suddenly, with a hypoglycemia, and died in a cardiac attack, probably angina.

I feel it is very essential that each elderly diabetic patient should have a thorough examination of his heart, including an electrocardiogram, to determine if he is not a potential case of angina pectoris, which might occur during treatment. The old idea that severe starvation was not good for an elderly diabetic holds just as true today as it did formerly. Many of these individuals have had attacks of angina while under a relatively high diet with large amounts of insulin, which combination brought about the same condition that we feared under the old regime. I therefore feel many elderly diabetics are better if allowed to have a small amount of glycosuria constantly. It has been shown recently by Strouse that many of these individuals develop their anginal attacks during periods of relative, or true, hypoglycemia. We realize a diabetic individual over the age of forty usually shows an arteriosclerosis of his vessels, which can be demonstrated by X-ray of the vessels of the feet, or by electrocardiographic investigation.

Most elderly patients do not care for as much food as younger individuals. They are usually willing to stay on a diet as outlined under Diabetic Diet No. 1. You will note that this allows a little bread, oatmeal, or potato, each day, even though it is restricted in carbohydrate. This diet is usually very acceptable to the obese individual. At times, of course, we may even restrict the fats to 100 grams.

Two other diets as outlined in the charts are also used. I feel most individuals are happy on a diet somewhere between 100-140 grams of carbohydrate. The ability to take these diets without the use of insulin indicates a great deal milder case. Most patients on as high a diet as outlined in Diabetic Diets No. 2 and No. 3 usually need some insulin. It has been our experience in the University Diabetic Dispensary that it is unusual to require more than 25-40 units a day except in the very severe cases. The caloric requirements in all three diets can be increased or decreased in amount, depending upon the necessary caloric intake for the individual.

The necessary intake, or basal diet, depends upon the individual's height, weight, and age.

DIABETIC DIET NO. 1

C. 65 gms.; P. 65 gms.; F. 150-200 gms.; Cal. 1870-2320

Breakfast:	*Amt.*	*Gms.*
10% fruit	1 serving	100
Bacon, cooked	4 strips (3¼")	15
Egg	1	50
Cream, 20%	½ cup	113
Dinner:		
5% vegetable	1 serving	100
10% vegetable	1 medium serving	84
Meat (lean)	1 serving	100
10% fruit	1 serving	100
Mayonnaise	2 tbsp.	50
Butter	2½ squares	25
Cream, 20%	½ cup	113
Supper:		
5% vegetable	1 serving	100
10% vegetable	1 medium serving	84
Eggs	2	100
10% fruit	1 serving	300
Mayonnaise	2 tbsp.	50
Butter	2½ squares	25
Cream, 20%	½ cup	113
To the above add ONE ONLY of the following:		
Bread, or	1 slice (¼" thick)	20
Oatmeal, cooked, or	⅜ cup	90
Potato	½ (2½" diam.)	50

DIABETIC DIET NO. 2

C. 100 gms.; P. 65 gms.; F. 200 gms.; Cal. 2460

Breakfast:	*Amt.*	*Gms.*
10% fruit	1 serving	100
Bacon, cooked	4 strips	15
Oatmeal, cooked	½ cup, scant	100
Toast	½ slice (¼" thick)	10
Cream, 20%	1 cup	226
Butter	½ square	5
Dinner:		
5% vegetable	1 serving	100
Potato	1 (2½" diam.)	100
Meat (lean)	1 serving	100
Butter	2 squares	20
Cream, 20%	¼ cup	56.5
Mayonnaise	2 tbsp.	25
10% fruit	1 serving	100
Supper:		
5% vegetable	1 serving	100
10% vegetable	1 large serving	150
Eggs	2 medium	100
Mayonnaise	2 tbsp.	25
Bread	1 slice (¼" thick)	20
Cream, 20%	¼ cup	56.5
10% fruit	1 serving	100
Butter	2½ squares	25
Cereal Substitutions		
Oatmeal, cooked	½ cup, scant	100
Farina, cooked	½ cup	100
Cornflakes	½ cup	14.2
Shredded Wheat	½ biscuit	14
Bacon Substitutions		
Omit Bacon, cooked	4 strips, 3¼"	15
And add Egg	½ medium	25
and butter	½ square	5
Egg Substitutions (Supper)		
Omit Egg	1 medium	50
and Butter	½ square	5
And add American cheese	1 cube	25

DIABETIC DIET NO. 3

C. 140 gms.; P. 65 gms.; F. 200 gms.; Cal. 2620

Breakfast:	*Amt.*		*Gms.*
10% fruit	1	serving	100
Toast	1	slice (¼" thick)	20
Butter	1	square	10
Oatmeal, cooked	½	cup, scant	100
Cream, 20%	1	cup	226
Bacon	4	strips (3¼")	15
Dinner:			
5% vegetable	1	serving	100
Potato	1	(2½" diam.)	100
Meat (lean)	1	serving	100
Bread	1	slice (¼" thick)	20
Butter	2	squares	20
Mayonnaise	2	tbsp.	25
15% fruit	1	serving	100
Cream, 20%	¼	cup	56.5
Supper:			
5% vegetable	1	serving	100
Either {15% vegetable or	1	serving	100
{10% vegetable	2	servings	200
Bread	2	slices	40
Butter	2	squares	20
Mayonnaise	2	tbsp.	25
Eggs	2		100
Cream, 20%	¼	cup	56.5
15% fruit	1	serving	100
Cereal Substitutions			
Oatmeal, cooked	½	cup, scant	100
Farina, cooked	½	cup	100
Cornflakes	½	cup	14.2
Shredded Wheat	½	biscuit	14
Bacon Substitutions			
Omit Bacon, cooked	4	strips, 3¼"	15
And add Egg	½	medium	25
and Butter	½	square	5
Egg Substitutions (Supper)			
Omit Egg	1	medium	50
and Butter	½	square	5
And add American cheese	1	cube	25

The amount of calories can be determined from Sandiford's and Boothby's old graphic chart or can be figured from Dubois' scale, which is found in any reliable book on metabolism. As a rule, the individual should be allowed about 50 per cent more than his basal requirement, which generally is in the neighborhood of 1800-2400 calories a day. All three of these diets can be easily changed to give any possible change in calories. This is usually done by increasing or decreasing the fat in the diet.

There are a few individuals, for example travelling men, who eat in hotels and restaurants and find it almost impossible to stay on a restricted diet. Under these circumstances their carbohydrate intake is around 175-190 grams. This is about all that any individual can ingest unless food is taken in a very concentrated form. If they are willing to stay on a diet of 175 grams, it is easy for them to pick out such a diet from any hotel menu. Any diabetic individual who is interested in his diet at all will be able to omit weighing his food to the exact number of grams outlined in any diet in a very short time. By observing how much makes a tablespoonful and a cupful, he soon has a very good idea of what the weight of his food should be. I do feel that each diabetic in beginning his first course of lessons should be made to weigh his food in order to learn what the weight of an average helping is. I believe it is unusual for any patient in the University Diabetic Dispensary or in my private practice to weigh his food within two months after his diet is established.

You will notice the portions allowed in these diets are listed under two headings, Amount and Grams. This makes it fairly easy for the patient to follow his diet within ten to fifteen grams of his intake each day. If he is using insulin the variation of his diet up and down from day to day is not of sufficient importance for him to weigh his food. This does not mean that his urine should not be tested daily. If it is found that he is showing an increasing amount of sugar, he should be more careful for a few days in order to clear up a moderate amount of the glycosuria. It is a very unusual individual who needs a diet of 175 grams of carbohydrates. This is not a marked restriction. During the last year it was found in a number of hospitals that the average diet of the internes and nurses in most institutions is somewhere between 125-140 grams of carbohydrates, 65-90 grams of protein, and about 100-200 grams of fat. If these healthy individuals can live on this diet, there is no reason why a diabetic individual, living on this diet and eating because of his disease, should not accept a low carbohydrate intake. I feel it is the rare individual who should be given a higher intake of carbohydrates, which in turn usually means a larger expenditure for insulin.

My only plea in offering this paper is to bring to your attention the laxity of the patient toward his diet, and the loss of responsibility of the physician to his patient that has developed in the last one to two years in the treatment of this disease. The physician should teach the individual as much as possible about food values, how to figure diets, and how to test urine. He should not discharge the patient from his mind after giving

him a syringe and a bottle of insulin. This may be carrying the picture a little bit too far, but I have seen cases in which this procedure has more or less been followed. I personally am not in favor of the relatively high carbohydrate diet which is used in some institutions with a larger amount of insulin. I feel in looking over the history of diets for individuals in health and in disease that the pendulum will probably gradually swing back half way between the relatively high fat diet of yesterday and the relatively high carbohydrate diet of today, and in the end our patients will be receiving diets somewhere between 100-150 grams of carbohydrates each day.

CONVULSIVE STATES IN ADULTS FROM THE NEUROLOGICAL STANDPOINT*

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CONVULSIVE states comprise those disturbances of the motor system associated with sudden, violent, localized, or widely distributed discharges of motor energy, usually accompanied by loss of consciousness followed by a period of exhaustion, stupor, or sleep. They may occur in any period of life from infancy to old age and represent a clinical syndrome caused by many different etiologic factors. Frequently convulsions in infancy do not present the grave significance as in adults, because of the generally recognized theory that during the first two years of life the cortical centers do not develop their inhibiting functions. Prior to this period the lower centers are in full control and the reflex irritability is correspondingly greater. For this reason apparently healthy infants often suffer from convulsions due to slight and unimportant causes. Nevertheless, convulsions in infants and children should never be treated lightly, for as Patrick and Levy[1] have pointed out, records of early convulsions were found in about 20 per cent of 500 epileptics. In a similar article by Thom,[2] 55 per cent of 111 epileptics gave a history of a convulsive seizure before the fourth year.

Due to the greater stability of the nervous system and due to the normal inhibitory control of the cerebral centers in the adult, an initial convulsion during this period of life always is either a forerunner of, or associated with, a grave constitutional disorder or with an acute or chronic inflammatory infectious, degenerative, or proliferative cerebral disease. For that reason every convulsion in the adult without any previous similar history frequently requires the most careful and thorough clinical, chemical, and sero-biological studies to determine its etiologic factor.

In recent years several articles have been written on pathologic disorders associated with convulsions. Cobb[3] in his classification enumerates 56 diseases. The major portion of his neurological conditions were placed in groups wherein edema, increased intracranial pressure, and anoxemia play an important rôle. Foerster[4,5] limits his list to organic neurologic diseases and gives eighteen groups. The following classification, although incomplete, comprises the disorders which are frequently associated with convulsive seizures in the adult, and which are commonly encountered in the routine practice of medicine.

1. Constitutional Disorders
   a. Uremia
   b. Toxemia of pregnancy
   c. Cardiac decompensation
   d. Stokes-Adams syndrome
   e. Tetany
   f. Alkalosis
   g. Pernicious anemia
2. Acute Cerebral Disorders
   a. Meningitis (various types)
   b. Encephalitis (various types)
   c. Cerebral trauma
   d. Vascular lesions (hemorrhage, thrombosis, embolism)
   e. Cerebral abscess
3. Chronic Cerebral Disorders
   a. Brain tumor
   b. Cerebral syphilis
   c. Cerebral arteriosclerosis
   d. General paresis
   e. Multiple sclerosis
4. Acute and chronic intoxication (alcohol, lead, strychnine, etc.)
5. Epilepsy (idiopathic)
6. Epilepsy (Jacksonian)
7. Migraine
8. Raynaud's disease and allied disorders

*Read at the meeting of the Southern Minnesota Medical Association held at Rochester, Minnesota, on September 12, 1932.

The group of constitutional disorders in which the convulsions are not on a neurological basis must always be considered in the differential diagnostic problem. The advances made in the studies of the blood chemistry, of the routine blood examinations, of the electrocardiogram, of endocrine imbalance, and so forth, have clarified many a case of so-called idiopathic epilepsy and placed it in its proper category.

Cobb[3] groups five conditions in which the convulsive seizures are precipitated by anoxemia of the brain. The first is the Stokes-Adams syndrome, in which, according to Mackenzie,[6] a heart block of seventeen seconds duration will precipitate convulsions. Similarly, paroxysmal tachycardia may be associated with convulsive attacks. Carbon monoxide poisoning and mechanical asphyxia as in strangulation frequently produce convulsions on a similar basis. Seizures may occur in pernicious anemia, due to the anoxemia of the nerve cells. The attacks developing with uremia and puerperal toxemia are evidently due to an associated cerebral edema.

CASE REPORTS

Case 1.—Uremia with convulsions.

B. E., a physician, aged 54, married, was seen in consultation with Dr. J. N. Gehlen on August 29, 1931. His family history was negative. His personal history was negative except for typhoid fever and pneumonia at 20. For a year he had had an occasional attack of indigestion which gradually became more pronounced. In November, 1930, this became associated with marked hyperacidity and gastric distress. In January, 1931, he consulted the Mayo Clinic and a duodenal ulcer was diagnosed. He was placed on an ulcer diet with marked relief of symptoms. Since that time he has been taking small amounts of alkalies regularly. During the week of August 23, 1931, while on a strenuous business trip his gastric symptoms became quite severe and he required large doses of alkalies for several days. On August 26 he developed a tonsilitis, fever, chills, and severe headache. These symptoms became more pronounced in twenty-four hours, his vision blurred, his headache intense, and he vomited. He continued with his alkaline treatment. On August 29, about 10 a. m., he had a generalized convulsion. At 12:15 p. m., he had recovered and dictated several letters. Soon after, his convulsions recurred, became continuous, and he was in a moribund state when admitted to the hospital at 2:30 p. m. The convulsions continued, his pupils were pin-point, pulse 160, temperature 102. He was anesthetized to control the convulsions; 1000 c.c. of normal saline were given intravenously because of the probable diagnosis of alkalosis. A lumbar puncture was done and 40 c.c. of clear spinal fluid under marked pressure were removed. The convulsions ceased, but irregular twitchings of the face and shoulders continued and the patient was delirious off and on for several days. The neurological examination was negative throughout except for miotic pupils.

The spinal fluid was negative. Blood: w.b.c., 17,900; differential count, normal; blood sugar, .104; creatinine, 2.19; urea nitrogen, 25.4; urea, 54.3; chlorides, .713; Van Slyke CO_2, 67%. Urine, normal except for some albumin and a few hyaline and granular casts. Blood pressure, systolic 140, diastolic 80.

He was placed on sedatives and elimination and restricted diet. His pulse and temperature gradually returned to normal. He was discharged from the hospital on October 8, 1931. He has remained well and attended to his practice to date except for a tonsillectomy on November 16, 1931.

Case 2.—Brain tumor diagnosed puerperal eclampsia.

Mrs. E. O., aged 36, married, seen in consultation on March 10, 1929, gave a negative family and personal history.

She had passed through two previous uneventful pregnancies and given birth to healthy offspring. Her third pregnancy was uncomplicated during the first six months. About the seventh month she developed headaches, which gradually increased in severity. About one month later these became associated with an occasional attack of vomiting, and at times a slight trace of albumin in the urine. Blood pressure varied around 130 systolic, and 70 diastolic. Blood chemistry was normal. On the day of her delivery she had a severe generalized convulsion. A diagnosis of puerperal eclampsia was made. Several hours later she was delivered of a normal healthy child. Her convalescence was uneventful except that the headaches continued in severity and on the fourth day she had another generalized convulsion. During the following two weeks she had three similar attacks and about this time she manifested some weakness and awkwardness of her left upper extremity. A neurological examination at this time revealed a moderate bilateral choked disc. All other cranial nerves were normal. The right upper extremity was normal throughout. The left manifested some ataxia and hypertonicity, moderately increased reflexes, normal sensation; muscle strength fair. The right lower extremity was normal throughout. The left showed a moderately increased knee and ankle jerk and a positive Babinski. Sensation was normal. The abdominal reflexes could not be elicited because of flabby musculature. Urine was normal. Blood pressure, systolic 130, diastolic 76; blood Wassermann, negative. The spinal fluid pressure was somewhat increased, showed a count of 3 cells, a trace of globulin, a negative Wassermann, and a negative colloidal gold curve.

A diagnosis of a brain tumor in the right motor area was made. A decompression operation over this region revealed an inoperable infiltrating tumor, probably a glioma.

The acute cerebral disorders which are associated with convulsions frequently present a definite neurological syndrome suggestive of an

organic disease. Among these are the Kernig sign, rigid neck, oculo-motor disturbances, hemiplegia, reflex changes, temperature, etc. For that reason, the fundamental disease can be usually diagnosed. In meningitis, encephalitis, and cerebral hemorrhage the acute onset and the virulent course readily distinguish these conditions, when associated with convulsions, from an essential epilepsy. Blood studies and spinal fluid examinations often definitely determine the underlying etiology. Lumbar punctures are readily resorted to because it is apparent that the convulsion is simply a part of the acute syndrome.

In the chronic cerebral disorders the convulsion itself may be the *only* outstanding symptom for a period of months, or even years. A cursory neurological examination reveals no abnormal reflex changes, and a diagnosis of hysteria or essential epilepsy is made. Every adult with an initial convulsion, regardless of the neurological findings, is entitled to the benefit of spinal fluid studies, of complete examination of the blood, fundi, fields of vision, and so forth, to determine the underlying etiologic factor. Cerebral syphilis and general paresis occasionally manifest convulsions for some period prior to the development of other signs. Brain tumors may have convulsive seizures as their first symptom for months or years before further manifestations present themselves. Parker[7] in a series of 313 cases of brain tumor encountered major epileptic seizures in sixty-seven (21.6 per cent). Convulsions occurred as an initial symptom of the disease in thirty-eight patients, thirteen of whom gave no other complaint for one or more years. Prichard[8] reports five cases in which a brain tumor gave rise to generalized convulsions and to status epilepticus for many years (in Case 1 for eighteen years) before any other signs indicating a local cerebral lesion were detected. He believes that these tumors are slow growing and usually located subcortically. Gotten[9] suggests the use of encephalography as a diagnostic measure in cases of late epilepsy. By these means a clear concept of the pathologic condition is usually demonstrable and it offers a most important aid in the differential diagnosis.

Cerebral arteriosclerosis probably presents one of the most difficult diagnostic problems in this group of chronic cerebral disorders. Convulsive seizures may manifest themselves during any stage and are on the basis of either an anoxemia due to impaired cerebral circulation or a temporary cerebral spasm. Woltman[10] called attention to the fact that arteriosclerosis may occur primarily in the cerebral blood vessels without any demonstrable clinical evidence in the general arterial system, and without any associated hypertension. Although this disease is frequently encountered in the degenerative period of life, cerebral arteriosclerosis may occur at any age. In discussing Woltman's paper, the writer reported a case of a boy, aged 19, who died of a cerebellar tumor. Postmortem examination revealed the tumor in the right cerebellar lobe, along with marked arteriosclerosis of the cerebral blood vessels, especially the circle of Willis. Barron of Minneapolis at the same meeting reported a case of a girl, aged 13, who died of cerebral hemorrhage. Postmortem revealed advanced atherosclerosis of the arteries, especially marked in the cerebral vessels.

Examination of the fundi must never be neglected, since retinal arteriosclerosis always means an associated cerebral arteriosclerosis; the reverse, however, is not necessarily true. Vertigo, headache, and slight personality changes, or even mental impairment, are the most frequent and constant early manifestations. A normal blood pressure has no special significance, as a large percentage never manifest hypertension of any degree during the entire course of the disease. In Woltman's[10] series of 146 cases, 64.4 per cent had a mean pressure of 130 systolic and 78 diastolic.

Case 3.—Cerebro-spinal syphilis with convulsions.

S. M., female, single, aged 43, a teacher, was seen in consultation with Dr. J. B. Brimhall, St. Paul, April 3, 1926.

Her family history was negative.

She had had an appendectomy in 1912. She denied venereal disease and exposure. Her hymen was intact.

Early one morning in March, 1925, at the age of forty-two, she had a fainting sensation, fell from a chair, and was unconscious for several minutes. She recovered but had to remain in bed for twenty-four hours because of marked general fatigue and severe headache. She remained perfectly well until November, 1926, when she had a similar attack. Her third convulsion on January 25, 1926, was more severe. For three hours previous she had a smothering sensation and a "lump feeling" in her throat, followed by unconsciousness and generalized twitchings. She regained consciousness in about one-half hour, but had to remain in bed for one week because of severe headache and marked fatigue. These attacks recurred about every two weeks. In the interval she was well and attended

to her duties. There was no bladder disturbance, nausea, or headache.

The physical examination was negative throughout.

The neurological examination revealed both pupils equal, round, and responded normally to light and accommodation. The fields of vision and fundi were normal. All other cranial nerves and upper extremities were normal. The Romberg was negative. The lower extremities were negative throughout except for moderately increased but equal knee jerks and a right positive Babinski.

Hemoglobin was 80%; blood pressure, systolic 128, diastolic 90; urine, normal. Blood Wassermann was negative. A diagnosis of a probable brain tumor was made and spinal fluid examination advised. The spinal fluid was clear, under moderately increased pressure, a cell count of six, globulin positive, Wassermann 4 plus, colloidal gold curve in the luetic zone. Diagnosis, cerebral lues.

She was placed on intensive antiluetic treatment with repeated spinal drainage. Her spinal fluid became negative after six months' treatment. Her attacks became less in frequency and severity and her last spell occurred July 1, 1927. The last examination on July 3, 1932, was negative throughout except that her knee jerks were sluggish. Her spinal fluid was normal and she has been free from attacks for five years.

Case 4.—Epilepsy on a syphilitic basis.

B. F., a male, aged 38, a farmer and single, was seen in consultation with Dr. C. E. Harkey at the U. S. Veterans Hospital in May, 1924.

His family history was negative. His personal history was negative except that he contracted gonorrhea at the age of 22.

In 1922, at the age of thirty-six, he suddenly had an attack of unconsciousness associated with a generalized convulsion. These attacks would occur at irregular intervals averaging about six during 1922 and nine during 1923. There was no special change in the character of the convulsions. Of late he had developed some vertigo and dull headache. His bladder and sexual functions have been normal.

The physical examination was negative.

The neurological examination was negative except that the left pupil was larger than the right, and it did not respond to light. The other cranial nerves, fundi, reflexes, sensation, and so forth, were normal. The routine laboratory tests, including a blood Wassermann, were negative. The spinal fluid was under increased pressure, contained 29 cells to the c. mm. and showed a positive globulin, a positive Wassermann, and a leutic colloidal gold curve.

He was placed on intensive antiluetic treatment with repeated spinal drainage. Although the spinal fluid gradually returned to normal, his seizures continued, although less severe, and with the addition of luminal became less frequent.

The pupillary findings in this case strongly suggested the etiologic factor.

Case 5.—Brain tumor with convulsions for twelve months prior to other symptoms.

C. F., a minister aged 48, married, was seen in consultation with Dr. G. M. Dill, Prescott, Wisconsin. His family and personal history were negative.

On March 12, 1927, he had a generalized convulsion without any constitutional manifestations. He suddenly became unconscious, had a grand mal seizure, recovered in about ten minutes, had a headache for an hour, then was perfectly well. He had a similar attack on April 27 and another one on June 7. There were no other complaints or symptoms. Examination on June 12, 1927, was negative throughout. Cranial nerves, fundi, reflexes, and so forth, were normal. Hemoglobin 82 per cent; leukocyte count, 8,200; blood pressure, systolic 135, diastolic 70; urine, normal. The blood Wassermann was negative. The spinal fluid was under normal pressure, clear, 3 cells, a trace of globulin, Wassermann negative, colloidal gold test negative. He was placed on phenobarbital and was free from convulsions for six months. On February 6 and March 4, 1928, he had three marked seizures. About one week later he developed some weakness and ataxia of the right arm and an occasional headache. A few weeks later some difficulty in his right leg manifested itself in that it was awkward and tired easily.

Examination on March 20, 1928, was negative except for impaired motor strength in his right arm and right leg. The deep reflexes were increased, there was a positive Babinski on the right side, some ataxia with the finger-to-nose and heel-to-knee tests. The right abdominal reflexes were sluggish; the left, normal. Sensation was normal. The fundi and fields of vision were normal. The spinal fluid was normal except for increased pressure.

A diagnosis of brain tumor, left Rolandic area, was made. A decompression operation revealed a tumor over this area. It was well defined, but infiltrating (a glioma), and could only be partially removed.

EPILEPSY AND MIGRAINE

The initial convulsion in essential epilepsy occurs in the greatest majority of cases in infancy or early childhood. In some of the older textbooks an arbitrary age limit of up to thirty-five years is given, prior to which time the first attack may occur. Any initial attack manifesting itself at a later age was considered due to some structural disturbance and not on an idiopathic basis. Rarely, however, essential epilepsy may occur later and has been designated as "epilepsie tardie" or late epilepsy. In a careful investigation of the past history of such patients one frequently obtains symptoms suggestive of a developing epilepsy. Many so-called mild hysterical attacks in the young are undoubtedly abortive seizures and only later in life major convulsions manifest themselves. Frequently unrecognized petit mal attacks occur over a prolonged period. Muskens[11] believes that slight myoclonic twitchings, short

periods of unaccountable fatiguability, the persistent Chvostek sign, vasomotor phenomena, such as marked blushing or pallor, and similar manifestations in the young, may be prodromal symptoms of a late oncoming epilepsy.

Migraine, similarly, may manifest itself for years and in later life be associated with epileptic seizures. Occasionally the convulsions apparently replace the migraine and no further headaches occur. Ulrich[12] in a series of 500 migraine patients reports an associated epilepsy in 12 per cent. Flatau[13] in a similar series found 7.2 per cent. He believes that in migraine patients with marked ocular phenomena subsequent convulsive seizures are more prone to develop.

The convulsive seizures of an essential epilepsy rarely assume the characteristics of a Jacksonian type. This form, however, is frequently on the basis of some definite localizing cerebral lesion, usually in the sensori-motor area, and may occur at any age, depending upon the development of the pathologic process. The diagnostic signs of a Jacksonian convulsion are: (1) That the convulsion always has its onset in the same location; (2) that the progress of the motor involvement corresponds to cerebral localization; (3) that the extremity first involved frequently manifests some temporary impairment of function, subsequent to the seizure; (4) there may or may not be an associated unconscious period.

The following cases are illustrative:

Case 6.—Migraine in early life with subsequent epilepsy.

A. M., a male, aged 32, single, and a carpenter, was seen February 26, 1929.

His family history was negative except that his father had suffered from diabetes for years, and his mother and maternal grandmother had had migraine.

His past history was negative except for the usual childhood diseases.

At the age of three he began to develop periodic headaches, which would occur at irregular intervals, averaging about fourteen a year. He described them as follows: His vision would suddenly become blurred associated with a buzzing sensation in his head. Soon after he would see flashes of light, usually of a red color, accompanied by pain in his right shoulder, gradually extending to the right side of his head. Then the headache would become very severe, and he would have nausea and vomiting. The severe headache continued for from two to twelve hours, then would gradually subside.

In March, 1927, at the age of thirty, he suddenly developed a generalized convulsion associated with unconsciousness, and since then he has had five major attacks, the last one occurring February 20, 1929. He gives a rather indefinite history of petit mal seizures during which his left arm would jerk slightly and he would feel confused for a few seconds. During the past year he had four or five of these attacks. Since the onset of his convulsions two years ago his headaches have been less frequent and less severe.

The physical and neurological examinations were negative throughout. The cranial nerves, fundi, reflexes, sensation, and so forth, were normal. Hemoglobin, 82 per cent; blood pressure, systolic 120, diastolic 70; urine, normal. His blood Wassermann was negative. The spinal fluid was clear, under normal pressure, contained 7 cells, a negative globulin, a negative Wassermann, and a negative colloidal gold curve.

He was placed on phenobarbital and his fluid intake restricted. Under this regime he had two slight headaches and one major convulsion during the following year.

Case 7.—Epilepsy diagnosed hysteria during early life.

Mrs. M. G., aged 33, married, was seen in consultation with Dr. F. E. Butler, Menomonie, Wisconsin, August 17, 1932.

The family history was negative. The personal history was negative except for mumps and measles in childhood; an appendectomy at 12. Her menstrual periods were normal. She had never been pregnant.

At the age of twenty-one she had an abscessed tooth which was lanced and drained for one week. She lost five pounds in weight. About three weeks later she developed her first attack. These have continued up to the present time and are gradually becoming more pronounced. They occur from four a month to one in two months. Four years ago she was free from attacks for six months. They bear no relation to her menstrual period. The attack begins with a tight sensation in her stomach. Associated with this she develops a feeling that whatever she is doing or wherever she is at the time of the attack she has experienced it previously. But even during the spell she realizes that this is not true. The attack is of about one-half minute duration, is not associated with unconsciousness but is followed by a short period of fatigue. During 1930 she passed through a period of mild depression of six months' duration. She consulted several physicians and was told that these attacks were entirely hysterical and to ignore them. In November, 1930, at the age of thirty-one, she developed her first grand mal attack with generalized convulsions and unconsciousness. These occurred about once a month, associated with her menstrual period, and were both diurnal and nocturnal. The physical and neurological examinations were negative throughout. All cranial nerves, fundi, reflexes, sensation, and so forth were normal. Hemoglobin 81 per cent; blood pressure, systolic 108, diastolic 78; urine, normal. Blood Wassermann was negative. A spinal fluid examination made September 10, 1932, revealed normal pressure, three cells, a negative Wassermann and negative colloidal gold curve.

The early attacks evidently were petit mal in type and continued so for ten years, until her first grand mal attack manifested itself in her thirtieth year.

Case 8.—Jacksonian epilepsy of undetermined etiology.

B. E., female, aged 35, single, a cook, was first seen April 8, 1932.

The family history was negative except that one brother died at the age of three in convulsions.

Her personal history was negative. She is right-handed. She denies venereal disease but admits exposure. Her first attack occurred eight years ago within one month of her first sexual experience. (This is mentioned because of the possible luetic factor and the positive spinal fluid.) This seizure began at the age of twenty-seven with a drawing sensation in her left eye, followed by a twitching of the left side of her face, and a peculiar chewing movement of her jaws of several minutes duration. She had four similar attacks during the next three months. About this time she had her first Jacksonian spell. This began with a cramp-like feeling in her left hand gradually extending up the arm to the shoulder. This was followed immediately by excruciating pain of the entire arm. She suddenly became unconscious. When she recovered she noticed that she had chewed her tongue. During the next three months she had six spells limited to the face only. During the next three years both types of spells occurred in severity and frequency. She had a series of eight severe attacks in ten days. The attack would begin in the left hand, involve the left arm, then the left face, and then the left leg, with or without unconsciousness. After the attack the left arm and leg would be numb and paralyzed for about fifteen minutes. In 1929 she had a large series of convulsions limited to the face, about 400 in nine days. Since that time there has been numbness of her left upper lip. For ten months following this she was entirely free from all attacks. During the past ten months she had a constant feeling in her left hand as if a spell were coming on. The most frequent type during this period has been the involvement of the left arm, face, and leg, with a subsequent motor weakness of one-half hour to ten hours duration. All attacks have been limited to the left side.



Fig. 1. Anterior posterior view of Case 8, Jacksonian epilepsy. Right lateral ventricle occluded; left lateral ventricle normal, but displaced slightly to the left.

She has been taking from 4 to 12 grains of luminal daily for several years with variable benefit.

In 1926 she was under the care of Dr. W. Long, Fargo, North Dakota, who found a four plus Wassermann, 28 cells, a positive globulin, and a luetic colloidal gold curve in the spinal fluid. Intensive antiluetic treatment intravenously and intraspinally gave no clinical improvement except a return to a normal spinal fluid.

In 1928 she was at the Mayo Clinic, where a diagnosis of a subcortical lesion, right motor area, was made. Her spinal fluid was normal at this time, but, on the basis of previous positive serology, antiluetic treatment was given.

She never had any headache, nausea, vomiting, or any other symptoms suggestive of intracranial pressure.

The physical examination made in April, 1932, was negative throughout. The neurological examination was negative except for a horizontal nystagmus bilaterally, a slight weakness of the left angle of the mouth, a slight increase of the tendon reflexes with some ataxia of the left arm and leg. There was no Babinski and sensation was normal throughout. While in the hospital she had several Jacksonian attacks, following which there was marked impairment of muscle strength of the left arm and leg with gradual return to normal. All laboratory findings, including the spinal fluid examination, were normal.

An encephalography made May 2, 1932 (see figure), showed that the right lateral ventricle could not be visualized, that the left lateral ventricle was of normal size and shape but displaced slightly to the left. Following the air injection she was entirely free from convulsions and without any medication for two months. After that time the attacks recurred as before.

A diagnosis of a subcortical lesion in the right motor area obstructing the right lateral ventricle was made. She was advised to return to the Mayo Clinic for a decompression operation, which she refused to do.

COMMENT

An incomplete classification of diseases in adult life associated with convulsions is given.

The necessity of thorough and repeated examinations is emphasized along with the importance of spinal fluid, blood, fundi, and other investigations in order to arrive at the correct etiologic factor.

Essential epilepsy and hysteria must be considered. Usually these can be excluded after exhaustive research and after further development of the underlying disease.

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CASE REPORTS

CALCIFICATION OF PERICARDIUM*

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In a recent review of the subject of calcification of the pericardium, Smith and Willius found ninety-four cases which came to necropsy reported in the literature up to 1924. To the thiry-four cases in which the condition had been recognized in the course of the life of the patient they added one case. Because of the relative rareness of this condition I wish to report the following case in which calcification of the pericardium was proved in life.

REPORT OF CASE

A married man, aged forty-eight years, came to the clinic in 1924 with the complaint that two months previously he had been seized suddenly with severe palpitation with a noticeable irregularity of the heart while walking up a steep grade to his home. The blood had seemed to rush to his head and to cause dizziness so that he held to the fence to keep from falling. From that time he had had palpitation on slightest exertion so that it was necessary for him to stop two or three times during his walk home. His family history was apparently negative, although seven of his brothers and sisters had died of acutc infections during early life. His three children were healthy. At twenty-five years of age he had had mumps but except for this mild illness he had been in perfect health until the onset of palpitation.

Examination showed auricular fibrillation in a heart which was apparently normal otherwise. There was no evidence of decompensation. Cardiac regimen was instituted with some improvement in the condition of the patient.

In March, 1929, the patient returned stating that for the last month his abdomen had increased in size and he had some distress and bloating after meals. Dyspnea on exertion had increased. Examination showed the condition of the heart unchanged. The abdomen was filled with fluid and a large firm liver was felt. The urinalysis was negative. The hemoglobin was 85 per cent and the leukocytes numbered 9,700 in each cubic centimeter of blood. The differential count was normal. The Wassermann reaction of the blood was negative.

Abdominal paracentesis was done and a large amount of clear straw colored fluid was removed. After this abdominal paracentesis was done every one to two weeks for the next sixteen months. Salyrgan was given for a period of time but the response was not sufficient to give the patient relief so he asked that paracentesis be resorted to. During this time there was no apparent cardiac change and no edema of the legs.

August 16, 1930, the patient was in an automobile accident so he was admitted to the hospital. He suffered from a few bruises over the right side of the thorax posteriorly. Physical examination did not show him to be acutely ill. There was a mild icteric tinge to the sclera. Lungs contained a few râles at the base and the diaphragm was somewhat high. The heart was moderately dilated, totally irregular, with a soft systolic murmur which was heard best over the base. The pulmonic second sound was greater than the aortic second sound. The abdomen was greatly distended with fluid. The liver, which was palpated about 10 cm. below the right costal arch, was hard and not tender. Edema was present over the buttocks, sacrum and pretibial region.

Urinalysis showed a faint trace of albumin. Erythrocytes numbered 4,040,000, and leukocytes 8,900 in each cubic centimeter of blood; the differential count was normal. The Wassermann reaction of the blood was negative.

Roentgenologic examination of the thorax gave the diameter of the thorax as 34.5 cm. and that of the heart as 18 cm. (Fig. 1). A roentgenogram taken to

*From the Arrowhead Clinic, Duluth.

exclude fracture of the ribs showed a small area of calcification in the pericardium (Fig. 2). The electrocardiogram gave the cardiac rate as 84 with auricular fibrillation and there was evidence of a slight right ventricular preponderance. The T wave was inverted in all three leads. Basal metabolic rate was —23 per cent. A diagnosis of adhesive pericarditis and Pick's disease with cirrhosis of the liver was made.

During the patient's stay in the hospital abdominal paracentesis was done on five occasions; 4,000 c.c. of clear straw colored fluid being obtained each time. Digitalis and diuretics including salyrgan were given. He left the hospital in an improved condition thirty days after admission.

Following the patient's discharge from hospital abdominal paracentesis was performed every two to six weeks for the next two years. The interval was gradually shortened and for a month prior to readmission to the hospital paracentesis was necessary about every four to seven days. The condition of the heart, however, remained the same.

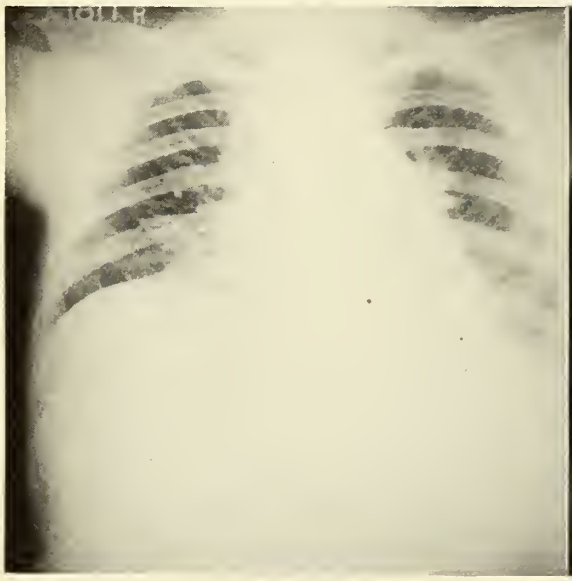


Fig. 1. Thorax in 1930. The heart is 18 cm. in width, the thorax, 34 cm. (6 foot plate).



Fig. 2. Roentgenogram taken to eliminate fracture of the ribs in 1930. Arrows show areas of calcification in the pericardium.



Fig. 3. Extensive calcification of the pericardium in October, 1932.

On admission to the hospital October 4, 1932, the patient appeared very ill. He complained considerably of discomfort in the abdomen after eating and stated that for the last week his legs had been swollen and that he was troubled with an irritating nonproductive cough. His skin was dry and scaling. The selera were moderately ieteric. The blood pressure was 80 systolic and 48 diastolic in millimeters of mercury. The heart was totally irregular with an apical rate of 120, and was slightly enlarged to percussion. Marked intercostal retractions were noticed over the precordium and Broadbent's sign was present. No murmurs were heard. The lungs were clear. The abdomen was markedly distended with fluid and there was some lower abdominal tenderness. The legs were edematous and the edema was especially marked over the dorsum of the feet.

Urinalysis showed slight amount of albumin and an occasional red blood cell to the high power field. Erythrocytes numbered 4,180,000 and leukocytes 13,400 in each cubic millimeter of blood. The hemoglobin was 80 per cent. Examination of blood chemistry gave the urea as 19.6 mg. and the creatinine 1.5 mg. for each 100 c.c. of blood. The icterus index was 11.8. Electrocardiogram gave the cardiac rate as 124 with an auricular fibrillation. The T wave was iso-electric in lead I and inverted in leads II and III. There was occasional

extra systole. Roentgenograms of the heart disclosed an extensive calcification of the pericardium with only moderate enlargement of the heart (Fig. 3).

Treatment consisted of the use of diuretics, salyrgan and ammonium nitrate, from which splendid response was obtained. The fluid intake was limited to 1,000 c.c. in twenty-four hours. Digitalization brought the pulse rate down from 120 to 90. The auricular fibrillation persisted. Two weeks before death frank thick gelatinous pus was obtained at abdominal paracentesis. On three subsequent tappings the same material was obtained. In spite of this purulent peritonitis there was no fever or rise in pulse rate and the bowels moved satisfactorily. The patient failed slowly, refused to eat and died, twenty-four days after admission to the hospital and eight years after his first cardiac symptoms.



Fig. 4. Gross specimen of the heart showing the left ventricle and the mitral valve. The arrows indicate the calcified pericardium which has been cut through.

REPORT OF NECROPSY

The peritoneum was moderately thickened. The intestines and stomach were firmly adherent, covered with a gelatinous exudate and situated in the posterior part of the abdomen; the anterior part of the abdomen contained 1,500 c.c. of thick gelatinous purulent material. The spleen weighed 370 gm., and its capsule was markedly thickened and whitish in color. The liver weighed 1,870 gm. Its capsule was also markedly thickened with a hyaline-like perihepatitis (Sucre Cucka Leber). The parenchyma of the liver showed marked cirrhotic change.

The transverse pericardium measured 14.5 cm. There was almost complete obliteration of the pericardial sac with extensive calcification in the form of large irregular plaques which measured 0.7 cm. in thickness and as much as 9.0 cm. in width. On palpation the heart had the consistence of a macerated fetal head. The heart with pericardium weighed 600 cm. The myocardium appeared normal. The left and right ventricles measured 1.2 and 0.5 cm. in thickness respectively. The left and right auricles were moderately distended. The valves were competent and the aortic valve measured 7.1 cm. in circumference, the mitral 11.5 cm. and the tricuspid 15.5 cm. The foramen ovale was patent but competent. The coronary arteries were moderately dilated and there was no evidence of sclerosis. Figure 4 shows the gross specimen with the left ventricle open. Figure 5 is a postmortem roentgenogram which coincides well with that taken of the heart before death.



Fig. 5. Roentgenogram of necropsy specimen showing extensive calcification.

COMMENT

A case of calcified pericardium and Pick's disease with cirrhosis of the liver is reported. The relationship between these conditions is difficult to determine. As the calcification of the pericardium was only accidentally found while taking roentgenograms to show the ribs, such a procedure is probably wise in order to ascertain the presence of calcium in all cases of adherent pericardium.

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CHRONIC ANEMIA WITH SPLENOMEGALY AND GRANULOCYTOPENIA*

P. A. Lommen, M.A., M.D.
Austin, Minnesota

In the medical literature of the past few years an increasing number of cases with marked diminution or absence of granulocytes in the circulating blood stream and a more or less characteristic syndrome have been reported. Most of the cases of the so-called acute agranulocytosis present little or no change in the

*Read before the Southern Minnesota Medical Association at Rochester, Minnesota, September 12, 1932.

red cell count, though some of the subacute and chronic cases may show some anemia. Hence, the reason for the report of the following case which exhibits a very interesting clinical history and a blood dyscrasia eventually terminating in a granulocytopenia.

REPORT OF CASE

The patient was a young married woman, aged thirty-two, who had been an invalid ever since the birth of her only child thirteen years before. At that time following a puerperal sepsis she developed a deforming ankylosing arthritis involving practically all her joints, now quiescent, but completely disabling her and making her bedridden. She had been anemic for years and for several years had had recurring attacks of severe upper abdominal pain lasting from a few hours to two weeks, accompanied by nausea and vomiting and often associated with or followed by a fever of varying duration.

She was first seen in September, 1929, in one of these attacks which had lasted for two days. The pain radiated to the right scapular region and up into the chest, somewhat characteristic of a gallbladder pain. Examination revealed an emaciated anemic young woman with contractures involving all the small and large joints of her extremities. The sclera and skin showed an icteric tint. Heart and lungs were normal. There was marked tenderness and rigidity in the right hypochrondrium and iliac fossa, and the spleen was enlarged to three fingers below the left costal margin. Pelvic examination was unsatisfactory on account of the deformities. Urine was normal; blood pressure 110/84; temperature 102° and pulse 124.

She was seen several times in 1929 and 1930 for similar attacks, sometimes with the pain more generally abdominal, and once for an attack of pyelocystitis. A blood count made in May, 1930, revealed a hemoglobin of 60 per cent, red cells 3,100,000, and leukocytes 5,850, with about 52 per cent polymorphonuclears. The spleen varied in size, at one time being only a finger's breadth below the costal margin.

The family history is somewhat interesting. Her father died of a marked anemia with possible gastric malignancy; her mother of influenza. Three sisters are living, two of whom have suffered at times from anemia. Her daughter was jaundiced the first two years of her life and was anemic until after the age of puberty.

On March 11, 1931, the patient became ill with a severe sore throat, chills, fever of 105 degrees, and marked weakness and prostration, which had been present for five days before she was seen. An ulcerating blister developed on the right hand. Her throat was fiery red, and several grayish patches were noted on the left tonsil and pillars. No Vincent's organisms were found. Blood count revealed hemoglobin 55 per cent, erythrocytes 2,550,000, and white blood cells 3,500, with neutrophiles 37 per cent, lymphocytes 46 per cent, monocytes 14 per cent, premyelocytes 2 per cent, and Turk's irritation forms 1 per cent.

The color index was 1 plus. The red blood cells showed considerable anisocytosis, with macrocytes and some microcytes, only moderate poikilocytosis, considerable polychromatophilia, and a very few nucleated red cells. Blood platelets were numerous. There was a definite increased fragility of the erythrocytes, hemolysis beginning at .50 and complete at .42. A blood culture was negative; Wassermann negative. Free HCl was present in the stomach contents. Urine was normal, aside from the constant presence of urobilin.

The throat gradually improved, but an acute pericarditis with moderate effusion and a fibrinous pleurisy (left chest) developed, causing such marked dyspnea that for two or three days her condition was critical. On April 5, the leukocyte count was 1,900, with only 19 per cent polymorphonuclears; lymphocytes 71.5 per cent; monocytes 8.5 per cent, and premyelocytes 1 per cent. However, by April 8 considerable improvement had occurred, with the disappearance of the pericarditis and pleurisy. The ulcer on the hand healed slowly. In spite of this, the hemoglobin was only 39 per cent on April 10, red blood cells 2,280,000, and white blood cells 2,100. By April 25, the hemoglobin had gone up to 46 per cent; red blood cells 2,490,000, and leukocytes 1,600, of which 26 per cent were neutrophiles. The spleen varied in size, the border once reaching the umbilicus.

On May 16, 1931, after the patient had gone home from the hospital, a typical trench mouth, with the presence of numerous Vincent's organisms, developed. Local treatment and a few intramuscular bismuth injections soon cleared this up.

She was seen during the summer and early fall several times for attacks of pain in the upper abdomen, some of them quite prolonged and severe. The spleen was much enlarged during some of these attacks. A fibrinous pleurisy on the right side was present on one occasion. On August 21 the leukocyte count was 2,400, with granulocytes 31 per cent, lymphocytes 64 per cent, and monocytes 5 per cent.

On December 2, she entered a Minneapolis hospital for observation. The findings were essentially the same, the white blood count ranging from 1,000 to 1,900, with only 4 per cent neutrophiles on one occasion. The icterus index was eight units, and the fragility of the erythrocytes was increased. Stool examination was negative. While there she ran an irregular fever as high as 103 degrees, and developed hematomata in the right ear and swelling and redness of the gums and upper lip.

In spite of her condition she insisted on going home December 25, 1931, and the mouth condition became gradually worse with the formation of grayish necrotic patches in the upper lip and upper jaw on the right, ulceration and necrosis developing to such an extent that the bone was involved and the roots of two teeth were exposed. No Vincent's organisms were found. However, by January 14, 1932, these ulcers had practically healed, when a severe glossitis developed on January 21, and later a deep necrotic area formed on the right cheek, opposite the lower molars. By February 19, the mouth again had almost healed, but on the 20th she became ill with a respiratory infection, either influenzal (as the other members of the family had been having influenza) or else terminal. She rapidly became worse and died on February 22, 1932. Due to some misunderstanding no notification of her death was received until the following day, so that no autopsy was obtained.

Blood examination made the day before death revealed a hemoglobin of 42 per cent, red blood cells 1,850,000, and leukocytes 750, of which there were 21 per cent granulocytes, all immature; 73 per cent lymphocytes, some abnormal, and 6 per cent monocytes.

COMMENT

The rather prolonged course in this case was probably partially due to the patient's indomitable will power. The exact nature and pathogenesis of the blood condition has been a matter of very interesting conjecture.

There is no doubt but that her hematopoietic system had been taxed to the limit by her continued infection and that the ability to produce granulocytes gradually failed in spite of the apparent clinical recovery from the mouth infection and some of the other intercurrent infections. For a year at least a chronic granulocytopenia was in evidence, but a true agranulocytosis never existed.

Although a malignant neutropenic state sometimes causes an enlarged spleen,[1,2] in our case the splenomegaly antedated by several years the beginning of the neutropenia. Hence, the constant splenomegaly associated with a marked anemia deserves special consideration.

A hemolytic jaundice was considered from the history of a constant slight icterus, a definite hemolytic anemia with slight increased fragility of the erythrocytes, the history of recurring attacks of abdominal pain resembling those of a cholecystitis or cholelithiasis (so often found in these cases), and the presence of anemia in the family. However, a recent fragility test on her daughter showed a normal response to hypotonic salt solution. The jaundice, too, was not as marked as that usually found in hemolytic icterus. The characteristic round microcytes were also less conspicuous than is usual in these cases. Of course, this does not rule out the existence of the acquired type of the disease.

That somewhat ill-defined group of cases known as splenic anemia should also be considered. However, the history is somewhat atypical, and there never was any hemorrhagic tendency, even before death.

At the Mayo Clinic a series of cases designated as chronic infectious splenomegaly[3,4,5] have been studied as distinct from splenic anemia, occurring after chronic infections, as arthritis, ulcerative colitis, endocarditis, etc., often secondary to a primary portal thrombophlebitis. Might not the case of this young woman come under this classification, her attacks of abdominal pain possibly arising from portal thrombophlebitis, which as a part of a long series of infections dating back to the puerperal sepsis and arthritis deformans, caused the splenomegaly with the coexistent hemolytic anemia and finally the hypogranulocytosis? An autopsy no doubt would have cleared up some of these questions.

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DIVERTICULUM OF THE GALLBLADDER

A. L. Pertl, B.S., M.D.
Windom, Minnesota

Mrs. R., a young married woman of thirty-two years, had always been well before her marriage in 1927. Her weight at that time was 140 pounds and showed a gradual increase up to 150 pounds during the three years following.

In 1929, the patient noticed distress after eating oranges but other foods gave no trouble.

During the patient's first pregnancy, which took place in August, 1930, she suffered much from nausea, vomiting and belching during the entire period of gestation. Seven days after delivery, in June, 1931, she suffered a severe attack of belching, nausea and pain throughout the entire right abdomen and extending through to the right scapular region. Similar attacks of variable duration and severity recurred following eating of fatty foods, pastry and meat, or extreme fatigue. In July, 1932, the patient complained of constipation and mentioned her inability to eat celery. At this time she was slightly jaundiced.

I was called to see the patient at 2:00 A. M. on November 2, 1932, because of another attack of severe abdominal pain extending through to the back on the right, with vomiting and nervousness. Temperature, pulse and respiration at this time were normal and the pain was relieved by hypodermic. I was told that the pain had been present for the past week and had been gradually getting worse. By afternoon of the same day the vomiting had persisted without change in the previous findings but a slight jaundice of the skin and sclera was noticed. The blood pressure was 120/60, the w.b.c. 9000. The patient was taken to the hospital at once and given 1000 c.c. of normal salt solution subcutaneously and four sodium amytal capsules per rectum. The following day the subcutaneous injection was repeated and three tablespoons of citrocarbonate of sodium and 500 c.c. of water were given every five hours. The following day 5 per cent glucose solution was administered subcutaneously and some 10 per cent of the same solution intravenously. Patient was able to leave the hospital on November 7 and improvement continued until November 17, when a similar attack recurred and the patient returned to the hospital for operation. Preceding the operation three sodium amytal capsules were given per rectum and two hours later 1 c.c. of pituitrin subcutaneously. This was followed by operation under ether anesthesia some twenty minutes later.



Fig. 1. Photograph of gallbladder with diverticulum. Actual size 2 × 1.5 inches.

An upper right rectus incision was made and upon opening the abdomen a few adhesions in the region of the gallbladder and liver were found. The tip of the gallbladder was adherent to the jejunum and, when freed, a diverticulum of the gallbladder was found to have perforated the wall of the bowel. The opening in the bowel was sutured at once and upon further inspection the gallbladder wall was found to be slightly thicker and more congested than normal. In the cystic duct was a stone ¾ inch in diameter which was milked back into the bladder before the duct was tied and the gallbladder removed. The appendix appeared to be subacutely inflamed and was,

(Continued on Page 218)

President's Letter

DEAR Fellow Members:

Last month I set up certain problems regarding the policy of the organized medical profession towards the care of the indigent. Many very interesting and valuable opinions were expressed for which I wish to thank the contributors and assure them that they are much appreciated.

This month I would like to obtain the reaction of the members of our organization on the following matter:

Do you consider that there are too many medical students going into specialties?

Do you think it would be better for our University Medical School to devote the facilities of the graduate school to retraining and keeping the man now in practice up to date in medical knowledge and skill rather than continuing the present plan of training specialists only?

Yours truly,

H. O. Pearce

President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

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MORE ABOUT THE COST OF MEDICAL CARE

The final report of the Committee on the Costs of Medical Care was considered of sufficient importance to warrant the State Association's calling a meeting of the interested professions on December 18 last, to hear a presentation of various viewpoints by those who had given the subject much thought. Unfortunately, MINNESOTA MEDICINE cannot reproduce the entire afternoon and evening program, but five of the addresses appear in this number of the journal, for the enlightment of those who were unable to attend the meeting.

The large attendance at the meeting indicated the widespread interest of the profession in the report. If all who attended had read the complete report from cover to cover they would probably not have been in a more receptive mood to hear the speakers. The mass of material contained in the report is only too likely to lead to mental indigestion and the conflicting recommendations of the majority and minority reports result in mental chaos. The meeting brought out very few ideas that could be construed as constructive. Perhaps there is no more solution to the problem of providing adequate medical care for everyone than there is to providing adequate food, fuel and clothing for everyone. Certainly we have not solved the latter problem. Doubtless the same factors of human inequalities and weaknesses interfere with the attainment of both ideals. The same proposals of group action and insurance are being proposed for each problem. We have the examples of the functioning of these methods in certain European countries. The disadvantages seem to outweigh the advantages.

It is well, however, for the medical profession to give serious thought to the recommendations of the Committee on the Cost of Medical Care. We should try to crystallize our attitude towards the problem so as to know how to meet innovations which are likely to be proposed. The fundamental consideration which most physicians consider essential to the satisfactory working of medical insurance is the maintenance of the free choice of physician. This has been the stumbling block in most insurance schemes. The extension of group practice of medicine and insurance would be most detrimental to the general practitioner who, it is agreed, is the backbone of the present system of medical practice.

As a matter of fact there is no one system of medical practice which is practicable and ideal for every community. It will be necessary in all probability for each community to settle its own problems as they arise, and each local group of physicians is likely to be called upon to settle its own economic problems.

It is questionable whether the people of this country want a revolutionary change in the rendering of medical care such as has occurred in European countries. There is good reason to believe that the quality of medical services in Europe has suffered through the socialization of medicine, and an enormous burden has been placed on the taxpayers.

Important as proper medical care is, we venture the opinion that the public today is not suffering nearly as much from lack of necessary

medical care as from lack of food, fuel and clothing. The enormous increase in free medical service during the last three years is evidence of our willingness as a profession to meet the medical needs of the public whether they pay or not. If some genius would only come forward with some insurance scheme which would relieve the profession of their unequal share of this burden and still maintain free choice of physician, he would be a godsend to the profession and to the public at large.

CERTIFICATION OF SPECIALISTS

There is evidence of some growing agitation for the adoption of some method of certification of specialists. The question of the proper training and recognition of specialists has occupied the attention of the Council of the American Medical Association for some time. Certain steps have been taken in a few European countries and in Canada for the certification of specialists. One of our State Medical Associations (New Jersey) was forced to institute a plan to avoid legislative action.

Admittedly the status of specialization in medical practice has been rather a hodge-podge. For the most part each individual's claims have been the main criteria of classification. Membership in local and national societies of specialists has resulted in recognition of special ability and interests, at least among one's confrères, and these societies have added some dignity and order to the specialties.

Just how much practical advantage to the public national or state certification of specialists would be, is a question. People in general are not inclined to be very discriminating and official recognition of ability is perhaps too often ignored. The specialist as well as the general practitioner increases his clientele for the most part as a result of his work, which is as it should be. The too narrow restriction of specialists by legislation is certainly not desirable. This phase of the bills which were recently proposed in the New Jersey legislature is said to have been the cause of their defeat.

The question is likely to arise whether we in Minnesota should make plans for the certification of specialists by our State Association, following in the footsteps of New Jersey, or await attempts at legislative control. If anything is done, it should be done by physicians and not by the legislature. The State Association could easily add a committee to its organization to act in conjunction with county committees. The issuance of certificates and even the publication of lists of certified specialists need not interfere with any individual's method of practice. The uncertified practitioner could still legally care for illnesses which he feels himself qualified to treat, but the certification of those with special training and experience would enable the discriminating layman to pick and choose a little more intelligently.

We can see some objections to the proposal. Bickering and personal animosities might arise. On the other hand, there are some good reasons for specialization and the certification of specialists, and the profession is the proper agency to do the certifying.

OVERSUPPLY OF NURSES

The nursing profession is confronted with the same problem of oversupply as the medical profession. During the next few years the problem is likely to become even more acute. The supply of nurses has been increasing at a much greater rate than the demand and it seems likely that it will take some years before a proper adjustment can be effected.

A survey of the situation in Minnesota was recently made by a committee of the Minnesota State Registered Nurses' Association and was published in the official journal of the association in December. The increase in the number of registrations since 1920 resembles the soaring of the stock market in pre-depression days.

The present Act relating to the practice of nursing was passed in 1907. Nurses meeting certain requirements were registered under a waiver until 1910. By 1920, 2,948 nurses had been registered; during the next ten years, 6,452. From January 1, 1930, to August 11, 1932, 2,639 additional nurses received registration certificates. With some 3,000 nurses in training at present it can be readily seen that the present oversupply of nurses will be aggravated rather than lessened in the next three years.

We have no figures available as to the number of nurses who have deserted the active ranks for other fields. We are informed, however, that there have been in certain districts in the state some fifteen nurses remaining on call to every nurse called for private duty since January 1, 1932.

There is some evidence that the training of nurses is being curtailed. Some training schools have been discontinued, some have temporarily suspended the enrollment of new classes, and in some hospitals the classes are noticeably smaller. It does seem as though concerted efforts should be made by those in charge of the nursing schools to curtail the supply in the interest of the present nursing personnel as well as those contempating entering training.

The proposed bill before the legislature for another waiver of qualifications for registration of nurses is unjust to the nursing profession. Such a step would lower the standards of the profession in the state and would cheapen the value of the R.N. degree. The nursing profession is in a position to increase the requirements in selecting candidates and thus raise rather than lower its standards. It is inconceivable that the proposed waiver will receive serious consideration.

OF GENERAL INTEREST

Dr. J. J. Swendson addressed the Washington County Medical Society at Stillwater, Minnesota, February 14, 1933, on the subject "Obstetrical Anesthesia and X-ray Pelvimetry."

Dr. A. E. Wilcox has been elected president of the staff of Abbott Hospital, Minneapolis. Other officers are: Dr. F. H. K. Schaaf, vice president; Dr. George Eitel, secretary. Members of the staff executive committee are: Dr. O. S. Wyatt, Dr. R. A. Johnson, Dr. K. Phelps; Dr. Ray Swanson, and Dr. Cecile Moriarity.

Hospital operating costs and other financial problems will be the principal topics of discussion before the delegates to the 1933 convention of the Minnesota Hospital Association, which will be held at the Curtis Hotel, Minneapolis, May 25 and 26.

Dr. O. J. Seifert, New Ulm, talked on "Spinal Anesthesia," showing four reels of moving pictures on the subject Technic of Spinal Anesthesia at the regular joint meeting of the Redwood-Brown County Medical Society and the staff of Union Hospital at the hospital in New Ulm, January 3, 1933. Eighteen physicians and six nurses from the hospital attended.

TRUDEAU SOCIETY RESOLUTION

The following resolution, unanimously passed by the Trudeau Society, has been received:

The Trudeau Medical Society, devoted to the study and prevention of tuberculosis, has, through a special committee, just concluded a careful study of the question of the case reporting of this disease.

According to the National Tuberculosis Association, Minnesota has the highest ratio of reported cases to deaths in the country. Last year, 3,424 new cases were reported. The ratio of cases reported to deaths was 3.22. There were 1,063 deaths. And the death rate per 100,000 was 41.1.

The morbidity rate ranges all the way from .97 in one section of the state to 2.77 in another.

The above figures show that there is a great variability in the ratio in different parts of the state. They also show that there are a considerable number of tuberculosis cases that are not reported until death.

Although this study would indicate that Minnesota ranks well to the front in the ratio of reported cases to deaths, we are still a long way from an ideal which seems reasonably possible of attainment.

Therefore, be it resolved by the Trudeau Society in the interest of improved reporting of tuberculosis in Minnesota, that the attention of the various interested groups be called to these facts, with the hope that still more interest may be shown and studies be undertaken to determine, if possible, the reasons why so many cases of tuberculosis are only reported by death certificates and also why there is such marked variability in the percentage of cases reported before death in various parts of the state.

Be it resolved that a copy of this resolution be sent to the Minnesota State Medical Association, Minnesota State Board of Health and the Minnesota Public Health Association.

Signed: C. B. Wright, M.D., *Chairman*
E. A. Meyerding, M.D., *Secretary*

MEDICAL CARE OF INDIGENT

In spite of discussions during the past four or five years, with reports of successful workings in other States, and with offers of data and assistance from your Committee on State Health Relations, only a very few local Minnesota medical societies have made any collective agreements with County Commissioners for better handling of medical care of the poor.

All of the five agreements in Minnesota, of which the Committee has information, are on the basis of the local minimum fee schedule with a percentage discount. They seem to be working satisfactorily. No Minnesota community or county has thus far established the so-called lump sum plan, though that plan elsewhere has apparently worked in practice with greater satisfaction to all concerned. Negotiations for establishment of such a plan are now going on in Duluth, and will, we hope, be successful. In two other counties the physicians have been discussing plans with the commissioners but have thus far been unable to convince them of its merits. In still other localities the physicians have been unable to negotiate because of lack of unity among themselves.

On the basis of the data at hand, it seems clear that the present system of care of the indigent by physicians appointed on competitive bids, even though apparently economical for the taxpayer, is an odious system. It leads to continual friction and is not satisfactory to commissions, physicians, or patients. Where a collective agreement has been made, the physicians and the authorities have been better satisfied, and, above all, the poor have received better medical care.

Your committee feels that the problem is very important and that it should have the earnest and effective attention of the members of all the local medical societies in Minnesota in order that a satisfactory solution may not be unnecessarily delayed.

Committee on State Health Relations,
T. H. Sweetser, M.D., Chairman.

OBITUARY

Theodore N. Kittleson

Dr. Theodore N. Kittleson, Fergus Falls, died of pneumonia complicating influenza on January 10, 1933.

Dr. Kittleson was born in Worth County, Iowa, March 21, 1875. A. few years later his parents moved to Canby, Minnesota, and he there attended the public schools. After a two years' business course at Decorah, Iowa, Dr. Kittleson took his medical course at the University of Minnesota and became associated with Drs. Cole and Drought at Fergus Falls. Following postgraduate study at Vienna and London Dr. Kittleson specialized in eye, ear, nose and throat diseases. Further studies were pursued in New York, Saint Louis and New Orelans.

In 1907 Dr. Kittleson married Miss Esther Munson Cole, an adopted daughter of Dr. and Mrs. A. B. Cole. Mrs. Kittleson died in 1913.

Dr. Kittleson was ever a lover of the great outdoors, and took pleasure in hunting and fishing. He was also an extensive traveler, several years ago having made a trip around the world. Enjoying an extensive practice, his charitable work was extensive, although known only to his intimate friends.

« A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION »

WORKMEN'S COMPENSATION OR UNEMPLOYED INSURANCE: WHICH?

Some eighty-five secretaries, officers, committeemen, and out-of-state visitors attended the 1933 Secretaries' Conference, a conference of special importance because of the pressing problems before the medical profession this year.

In a day given over to discussions of medical care for the poor, malpractice insurance, administrative problems, one of the outstanding sessions concerned itself with Workmen's Compensation Insurance. Speaking for this session were A. N. Collins, Duluth, Committee on Industrial Practice; J. M. Sweitzer, Saint Paul, Claims Manager, Employers' Mutual Liability Insurance Company; Niels Debel, Saint Paul, State Industrial Commissioner; J. M. Hayes, Minneapolis, Councilor, Sixth District; the Hon. Harry H. Peterson, Attorney General of Minnesota; and R. G. Leland, Chicago, Director of the Bureau of Medical Economics, American Medical Association.

All agreed that coöperative action on the part of the medical profession and the insurance companies is essential. Failing such coöperation, government insurance for injured workmen with all of its sequelæ looms in the distance.

Some interesting quotations from some of the speakers, indicating varying opinions, follow:

Mr. Debel: We have the doctors to thank for the present efficiency and high standards of our administration of workmen's compensation laws.

Attorney General Peterson: I suggest that you physicians try to amend the present law so that when an injured employee sues his employer for damages, the employer be empowered to pay physician and hospital fees direct.

Dr. Collins: Experience in New York City has shown us that our problems will best be solved by a working understanding with insurance companies.

Mr. Sweitzer: You men will readily understand that the injured employee cannot well be allowed to choose his own physician. If he were so allowed, he might choose a quack or a faker, and his employer—or the insurance company—who paid the bill would be powerless to stop it. Naturally, the man who pays the bill wants to have some voice in the choice of the doctor to whom he pays it. In addition it is necessary to pick a man close to the plant where the employee is hurt.

Dr. Hayes: It is fundamental to good medical care that we should insist at all times and in all our dealing with the public in any relation upon the right of the patient to choose his own physician regardless of who pays the bill or where his physician may be. The injured employee has that right in Minnesota according to good legal opinion based on a Supreme Court decision of two years ago.

In this we cannot yield to representatives of the insurance company in spite of the fact that, following a recent meeting in Minneapolis, we have a much better appreciation of the real problems faced by the insurance companies. Obviously for our own good and theirs we must get together with them as they have in New York. There, we understand, differences have been satisfactorily ironed out and things are going smoothly to the satisfaction of both the insurance carriers and the doctors.

Dr. Leland: It has been charged by the insurance companies, as an argument against right of choice of physician by the patient, that the doctor chosen by the patient is a partisan of the patient.

That charge is justified. The patient's doctor is and should be a partisan of the patient. What does the patient feel when he senses, as he surely must do, that an appointed physician is the partisan of the insurance companies or employer rather than of himself?

When you destroy the confidence of the patient in the physician you halt recovery and impair the readiness of the patient to supply essential facts relevant to the situation.

It is important that insurance carriers understand these things and also that we understand the problems of the insurance carriers. If we do not effectively get together, it is certain that government insurance will step in.

Suppose we take the load off workmen's compensation insurance and put it upon unemployed insurance? The authors of unemployment insurance will be sure to follow with the proposition: why shouldn't we take care of the health, also, of the unemployed? In a short time health insurance will take its place beside unemployment insurance. If it is adopted in all states we shall have an insurance system in America that passes any system now in existence in Europe.

At the present time there is only one state compensation body in the whole United States which has on it medical representation. We must attempt to be adequately represented on all such bodies. In every state society there should be an active committee on industrial practice, a committee that is in constant close contact with the state industrial commission.

We must coöperate with the insurance carriers, present to them our problems and make an honest attempt to see theirs. No doubt, we should have tried to work with the insurance companies before this. We cannot mend the past, but we can take steps to safeguard the future. If we start with the belief that all of us, including the insurance companies, want to be honest, we shall not fail.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

SPEAKER: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of March will be as follows:

March 1—Hypertension.
March 8—Cause of Burns.
March 15—Difference in Health Problems of Men and Women.
March 22—First Aid in Sprains and Fractures.
March 29—Tumors of the Breast.

AMERICAN UROLOGIC ASSOCIATION

The thirteenth annual meeting of the American Urologic Association will be held in Chicago June 20, 21 and 22, 1933, the week following the American Medical Association meeting in Milwaukee.

A large attendance and a fine scientific program are predicted, dry clinics from the wealth of material available at this cosmopolitan center to be furnished by Chicago urologists.

Applications for places on the program will be received by the Secretary, Dr. Gilbert J. Thomas, 1009 Nicollet Avenue, Minneapolis, until April 20, 1933.

Nominations for membership must be in the hands of the Secretary sixty days before the meeting.

MINNESOTA RADIOLOGICAL SOCIETY

The Winter meeting of the Minnesota Radiological Society was held at the Nicollet Hotel in Minneapolis, on Saturday, February 18, 1933, at 2:00 P. M. The following program was presented.

1. Pre-operative Diagnosis of Malignancy of the Liver with Thorotrast.
   Lester G. Ericksen, M.D., Minneapolis.
2. The Physical Basis of Chest Radiography (Work of R. G. Wilsey) and the Ruggles Cine-Cardiographic Film.
   Robert G. Morrison, Minneapolis.
3. A Simplified Technic for Roentgenography of the Optic Canals.
   John D. Camp, M.D., and Cesare Gianturco, M.D., Rochester.
4. Atypical Findings in Bone Lesions.
   Charles G. Sutherland, M.D., Rochester.
5. Roentgenologic Study of Bone Changes Accompanying Neurofibroma of the Spinal Cord and Associated Nerves. John D. Camp, M.D., Rochester. Discussion by W. A. O'Brien, M.D., Minneapolis.
6. Case Reports from the University Hospital.
   A. Demonstration of Methylene Blue Method for Calibrating Roentgen Ray Dosage. W. K. Stenstrom, Ph.D.
   B. Achondroplasia Advanced Ossification, Vertebral Osteochondritis. John B. Eneboe, M.D.
   C. Carcinoma of Breast, Skeletal Metastases, Response to Radiation.
      C. O. Hansen, M.D.
   D. Carcinoma of the Skin, Response to Radiation.
      Frederick B. Exner, M.D.
   E. Simulants of Mediastinal Masses.
      Leo. G. Rigler, M.D.

The Society was honored by the presence of Dean Richard E. Scammon of the University of Minnesota Medical School, who delivered a very illuminating and stimulating address on "The Contributions of Radiology to the Study of Growth."

At the business meeting a resolution was adopted endorsing the principles of the Code of Ethics of the Philadelphia Roentgen Ray Society.

The next meeting of the Society will be held in Rochester, Minn., May 22, 1933.

Leo G. Rigler, M.D., *Secretary.*

MAYO FOUNDATION LECTURES AND DEMONSTRATIONS IN MEDICINE

March 13 to 17, 1933

March 13 to 17, inclusive, a series of lectures and demonstrations in medicine will be given by the Faculty of The Mayo Foundation, Rochester, Minnesota. While these lectures are primarily for fellows of the Foundation, visiting physicians will be welcomed. The program will be largely in the form of clinics, patients being presented with discussion of the medical, surgical and pathological features of the cases. The morning sessions will start at 10:00 o'clock, the afternoon sessions at 2:00 o'clock and the evening sessions at 7:30 o'clock. The subjects to be presented are as follows:

Monday: Allergy; Diseases of the Upper Respiratory Tract; Bronchoscopy. *Tuesday:* Diseases of the Blood Vessels; Cardiology; Nephritis, and Hypertension. *Wednesday:* Diseases of the Biliary Tract; Constituents of Bile as an Index of Liver Function; Physiology of the Liver. *Thursday:* Diseases of the Colon; Neurology; Dermatology and Syphilis. *Friday:* Diseases of the Ear, Nose and Throat; Laryngology; Oral and Plastic Surgery; Ophthalmology.

BLUE EARTH COUNTY SOCIETY

At a regular meeting of the Blue Earth County Medical Society held at Mankato, Minnesota, the following officers were elected: President, Dr. H. L. Huffington; vice president, Dr. W. I. Howard; secretary and treasurer, Dr. R. G. Hassett; censor, Dr. E. W. Benham; delegate, Dr. A. G. Liedloff.

MOWER COUNTY SOCIETY

At the annual meeting of the Mower County Medical Society, held recently at Austin, Minn., Dr. J. G. W. Havens was elected president to take the place of Dr. P. A. Lommen, and Dr. W. B. Grise was elected vice-president. Dr. P. A. Robertson, Austin, and Dr. A. E. Henslin, LeRoy, were re-elected secretary and treasurer respectively. Dr. C. C. Allen read a paper on "Intracranial Birth Injuries."

At a preceding meeting, Dr. M. S. Henderson, Rochester, Minn., retiring president of the Minnesota State Medical Association, talked to the members on state association matters and then addressed the society on the subject of "Fractures of the Ankle Joint."

UPPER MISSISSIPPI MEDICAL ASSOCIATION

The Upper Mississippi Medical Association has chosen Dr. S. S. Shannon of Crosby, president; Dr. J. A. Thabes of Brainerd, vice president; Dr. G. I. Badeau of Brainerd, secretary-treasurer, and Dr. J. A. Thabes, Sr., censor. Mrs. S. S. Shannon was elected second vice president of the Ladies' auxiliary of the medical association.

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD DECEMBER 1, 1932

The President, Dr. Kenneth Bulkley, in the Chair

REPORT OF THE MEETING OF THE INTERNATIONAL MEDICAL ASSEMBLY

Held at Indianapolis, Oct. 24-28, 1932

Dr. E. K. Green said he did not wish to take time from the able speaker from Rochester so he would give only a few points on the program of the International Medical Assembly meeting which had impressed him as important.

First, he was struck with the opposite views held by men of high standing in the profession on the subject of pelvic infections and disorders. Dr. Otto Schwartz took the stand that inflammatory pelvic conditions should be treated conservatively with rest and local heat and positively "hands off." Even thorough examination and office treatment many times aggravates the trouble and makes the patient worse. If surgery is indicated at all it should be after the infection is completely subsided and then it should be radical with hysterectomy. On the other hand, Dr. John R. Fraser, of Montreal, took the stand that curetting the uterus with a dull curette did no harm and intrauterine treatment with mercurochrome and antiseptics repeated during the illness was the best procedure. Both gave statistics to prove their method to be the best.

Dr. Frank Lahey, of Boston, gave a report of his work on 12,000 cases of hyperthyroidism operated in their clinic with a mortality rate of ½ per cent. Dr. Green said he wished to mention one thing in this report which seemed to him to be most important and that is Dr. Lahey's method of determining how much surgery to do in any given case, and Dr. Green said he had gathered the same idea when he visited Lahey's clinic in Boston a year ago. On his first examination he decides how much surgery to do, namely, ligation, lobectomy or thyroidectomy, and he seldom changes his mind no matter how much improvement the patient makes prior to the operation. He has three main points of determination: (1) loss of weight; (2) pulse rate; (3) age.

Dr. Irvin Abel, of Louisville, Ky., gave a clinic and a paper going into the subject of diverticulosis and diverticulitis. He said the condition nowadays was frequently discovered in the routine X-ray examination and that the treatment was medical except when a diverticulosis was converted into a diverticulitis. Then there was no stereotyped procedure. Resection, drainage, or whatever the surgeon found best to do, was the proper treatment.

Dr. Dean Bevan, of Chicago, gave a clinic on gallbladder disease. He took the stand very definitely that gall stones per se were not an indication for cholecystectomy or drainage. The only reason for removal was when they were giving the patient trouble.

Dr. Dean D. Lewis, of Johns Hopkins, gave a very good clinic on osteomyelitis. He made a plea for conservatism in the treatment of acute osteomyelitis. He said that practically 100 per cent of these cases were not diagnosed until after most of the damage had been done to the bone and any chiseling or operation on the bone did much more damage than it did good. Just opening the periosteum was the best procedure. He says we hate to admit it, but when it comes to selectivity in chronic osteomyelitis, and the determination of what tissue should be removed and what not, the maggot seems to have much more intelligence than the surgeon, so give the maggot a chance.

Dr. John J. Moorhead, of Columbia University, gave a clinic and paper on traumatic surgery and fractures that was full of meat. One thing he stressed very definitely, which Dr. Green thought had not been fully appreciated, was what he called the "golden hour" in the treatment of fractures, and this was within the first six hours. If a case goes past that time the difficulties are more than doubled and end-results many times are jeopardized. For open wounds, soap and water, débridement, and placing the sutures and packing the wound is many times the best procedure. On the third day, with the first change of dressings, the sutures are tied.

The enlarged prostate came in for its share of attention on the program. The intraurethral method of operation occupied most of the discussion. Hugh Cabot, of Rochester, spoke very favorably of that method and said they were getting some very satisfactory results. Dr. Joseph McCarthy, of New York, however, said that possibly they were too enthusiastic. He said one must remember it is rather early yet to decide, and that so far the procedure is largely post-graduate work and experimentation on the part of urologists, and it might be well for most of the surgeons to wait until it was a little more standardized.

Dr. George Crile had his usual clinic to show the association of the three conditions about which he has had so much to say lately, namely, hyperthyroidism, peptic ulcer, and neurocirculatory asthenia. He has now operated 204 cases by denervation of the adrenals with a mortality rate of about 6 per cent. He reported one case of a doctor who had had several stomach operations with no relief. Denervation of one side six months ago had so completely relieved him of symptoms that he thought the second operation would hardly be necessary. Dr. Crile showed two cases, one a school superintendent and the other a civil engineer, who were both invalids and not working because of neurocirculatory asthenia. Both men were denervated and at present, after several months, both were working and looked to be perfectly well and enjoying good health.

ANESTHESIA

Dr. J. S. Lundy of Rochester (by invitation) gave a talk on the above subject, dealing especially with (1) sacral anesthesia, (2) spinal anesthesia (including a discussion of ephedrin in stimulating the circulation), and (3) intratracheal anesthesia, the latter being much used in plastic operations about the face where one wishes to get the anesthetist out of the way; it is also highly desirable for operations on the lung. One of the greatest benefits of intratracheal anesthesia is in cases in which general anesthesia by inhalation is not being taken well; the air-way is not free and the tongue is usually the organ in the way. Motion pictures were shown demonstrating methods of administering these three forms of anesthesia.

DISCUSSION

Dr. S. R. Maxeiner stated he was sure all those present had enjoyed Dr. Lundy's talk this evening. He said he had had the pleasure of observing Dr. Lundy administer one of his intratracheal anesthetics not long ago in a case in which the anesthetic was a very grave problem. There were a number of consultants on this particular case. Spinal anesthesia was considered and discarded as unsafe. Local anesthesia was considered as a possibility but the patient was particularly uncooperative. This patient would not stand any morphin or sedative without paralysis of respiration, but with the tracheal tube in place and the controllable pressure within the gas bag, the administration of the anesthetic was absolutely under control and this patient passed through a smooth, uneventful anesthesia. Dr. Maxeiner felt that in this particular instance the method had proved itself and that Dr. Lundy was to be con-

gratulated particularly on that case. Dr. Maxeiner felt that Dr. Lundy's discussion of spinal anesthesia is particularly timely. As he visited various clinics, there seemed to him to be no standardization of technic; one uses one drug and the next another drug; some use ephedrin and some do not. He believes that there must be some safe standardized procedure acceptable to the general surgeon that would add to the safety of the patient and do away with the necessity of the experimental stages for the beginner.

Dr. Maxeiner said that at Fort Snelling they had done between 1,500 and 2,000 with spinal and in that number only one death could be in any way attributed to the effect of the spinal anesthetic. That patient was uremic due to infected bilateral cystic kidneys and was possibly not a good case for this method, although the risk would have been grave under any anesthesia.

Dr. Maxeiner said he was particularly interested in caudal anesthesia, which method they had used for many years. When he was with the late Dr. Farr, they had done some work on fresh cadavers before rigor mortis had appeared by injecting the caudal canal with sodium bromide solution. The height of the injection was observed by the X-ray when different amounts of solution were used. The same results had been observed by others with the injection of methylene blue into the caudal canal. The solution, when put under pressure, will follow the line of cleavage clear up into the neck. Dr. Maxeiner had observed anesthesia as high as the nipples in one patient injected with 120 c.c. of 1 per cent novocain solution directly into the sacral canal. He and Dr. Farr had performed parasacral anesthesia, as advocated by Dr. Lundy, but had not found it superior to the injections into the caudal canal alone. He believed the simpler the method, the more universal would be its use. Dr. Farr had always tried to simplify his methods so that they could be applied by the general surgeon as well as by a local anesthesia specialist. They had standardized their technic so that they limited themselves to 30 to 35 c.c. of 2 per cent novocain solution injected through the caudal canal very slowly, and aspirating at the end of every two or three c.c. in order to avoid the grave danger of injecting intrathecally or into one of the veins in the sacral canal. Any change of respiration, pulse rate or blood pressure usually means that the solution is being injected too rapidly, under too great pressure, or that the patient is absorbing it too rapidly.

Dr. Lundy said that the intratracheal method has been introduced for operations on the upper part of the abdomen in which spinal anesthesia was formerly used. The tendency now is to leave spinal anesthesia for the lower abdominal operations and use the intratracheal method for the higher abdominal operations.

It really is not difficult to do a sacral block, since there are three important landmarks: the posterior median line, the posterior superior spine, and the coccyx. Dr. Lundy said he had taught a number of Fellows, and they will ignore these landmarks until they are impressed with their value. The posterior superior spine is the most important.

Dr. Ralph Knight said this paper had been a real treat to him, and he knew it was to every one present. He said he was especially interested in Dr. Lundy's standardization of the dosage in spinal anesthesia, for he believed there was nothing that has had expressed about it so many differences in theory and practice involved as has spinal anesthesia. Dr. Lundy graduated this according to the weight of the patient, and Dr. Knight felt that most men had not given this enough consideration. It deserves more thought. Dr. Knight cited the work of Mr. W. Howard Jones, Charing Cross Hospital, London, who recently has brought out something which should give one pause, *i.e.*, he believes that very high spinal anesthesias are really not so much spinal as general anesthesia; so much of the novocain is absorbed from the spinal canal, that when there is respiratory failure it is because of the action of novocain on the respiratory center through the circulation rather than up the spinal canal. Mr. Jones has worked out a table of dosage based on the length of the spinal canal. Dr. Knight felt that Dr. Lundy's method of grading the dosage should be followed, and perhaps work into it the factor of the length of the canal as well. He thought most men feel that spinal should not be used for work above the diaphragm. Dr. Lundy has shown by slides and pictures how easy it is to pass an intratracheal tube; but Dr. Knight said that any one who had tried it must feel that it is not so easy as it is for Dr. Lundy.

Dr. Lundy said that MaGill maintains that he can pass an intratracheal tube about eight times out of ten without using a laryngoscope.

Dr. J. A. Heidbrink (by invitation) in discussing the Lundy-Heidbrink respirator, said he did not know that he could add much to Dr. Lundy's description and illustration of the apparatus. He had simply made it according to Dr. Lundy's instructions as to what he wanted it to do. There is a blower operated by a motor. It blows at one end and there is a suction at the other end; then there are valves that are operated by a motor that alternately connect the pressure and suction end of the blower to the patient. The respiration rate is controlled by setting the rheostat which controls the speed of the motor that operates the valves. There are also some safety valves which Dr. Lundy did not mention. On the pressure side there is a valve to limit the pressure into the lung at any desired level and there is also a safety valve on the suction side limiting the amount of suction which can be put on the lung. The operation of the machine has been illustrated in the moving pictures, and Dr. Heidbrink felt that was pretty well understood after seing these films. He said Dr. Lundy had very kindly invited him to see some of the experiments done on animals. It had resuscitated dogs after they had been paralyzed with spinal anesthesia and the dogs lived on for a long time afterward. He had also seen the machine operated on the human subject. Dr. Heidbrink added that it always gave him great pleasure to try and work out something of that kind when some one has a definite idea of what he wants to accomplish with a certain machine.

Dr. J. F. Corbett asked the size of the intratracheal tube.

Dr. Lundy replied that its maximal outside diameter is 1.3 cm. (about one-half inch) and that smaller sizes are used.

Dr. R. R. Cranmer asked Dr. Lundy for his opinion on the use of ephedrin in connection with the sudden drop in blood pressure and whether the injection of ephedrin 10 minutes or so before the spinal injection was the proper method, or if it should be given just before.

Dr. Lundy said he thought it a very good plan to give ephedrin some time before the spinal anesthetic is given if the patient has hypotension, but if the patient has hypertension one does not give it until after the procaine is deposited in the spinal fluid. So far as giving ephedrin is concerned, if the blood pressure falls to a low point and it is then given hypodermically or intramuscularly it will not be very effective; but if it is given intravenously it will act quickly. Dr. Lundy said that Harrison and Burch have written that if one wants to get the greatest effect from ephedrin it should be given intraspinally. Dr. Lundy has not been obliged to adopt this method. Dr. Lundy said he knew that pituitrin given intraspinally will raise the blood pressure so that there is danger the patient may die.

Dr. Theodore Sweetser said that, in his experience in prostatectomy, the cases done with spinal anesthesia tended to bleed more than those done with caudal anesthesia, and asked whether that had been Dr. Lundy's experience. He added he would like to see the lantern slides which Dr. Lundy had mentioned as showing the

effect on the spinal cord; that one of the neurologists here had called attention to various nerve disturbances occurring a considerable time after operations performed under spinal anesthesia.

Dr. Lundy expressed the belief that there is a tendency for the patient to bleed more after spinal than after sacral block.

Dr. A. T. Mann asked Dr. Lundy if, when the heart stops, there is any better means than adrenalin to start it.

Dr. Lundy replied that the best and most effective way to restore activity of the heart is by massage through the diaphragm after incision has been made. If this is impossible in a given case, then epinephrin may be injected, the injection following aspiration of a little heart's blood; one should not be in such a hurry that aspiration is not performed. If one can ventilate the patient's lungs and keep them ventilated, then some effect from the work on the heart is possible, but if artificial respiration is stopped while one tries to get the heart started, failure may result.

Dr. Leo Murphy asked about the postoperative course following spinal anesthesia; as to whether it had been found superior to other forms of anesthesia from the standpoint of the patient.

Dr. Lundy said that at least 5 per cent of patients have headache after spinal anesthesia, but that 10 per cent have headache after diagnostic lumbar puncture.

One thing Dr. Lundy said he must mention especially and that is foot-drop. He had had two or three cases in which foot-drop had appeared, but it had disappeared after a time. These effects came after spinal anesthesia. Dr. Lundy also had two cases in which foot-drop came on after sacral anesthesia and three in which it came on after general anesthesia; so he did not feel that the spinal anesthesia caused the foot-drop. He was satisfied, after the report of Johnson, that no person at all well during sleep lies in the same position more than seven or eight minutes at a time. The person takes one of several positions. There must be some reason why people change posture so frequently while asleep. But a patient who is strapped to a table for a time has no chance to change position. Dr. Lundy said he had also seen semipermanent paralysis after sacral block because the patient had a spinal cord tumor. In this case the patient, a woman, had paralysis for nine months, and then a spinal cord tumor about as large as the little finger was removed. Dr. Lundy said he had never seen a proved case of bilateral paralysis that was entirely due to spinal anesthesia.

The meeting adjourned.

F. A. Olson, M.D.,
Secretary.

DIVERTICULUM OF THE GALLBLADDER

(Continued from Page 209)

therefore, removed. Drain was inserted lateral to the incision.

Fluids were given subcutaneously and per rectum following the operation until liquids could be taken by mouth and recovery was uneventful. The accompanying illustration is a photograph of the removed gallbladder showing the diverticulum at the fundus of the bladder and the gallstone which was present in the cystic duct.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

The Pelvis in Obstetrics. Julius Jarcho, M.D., F.A.C.S. Consulting gynecologist, Hastings Hillside Hospital, etc. 365 pages. Illus. Price, $6.00, cloth. New York: Paul B. Hoeber, Inc., 1933.

Chronic Arthritis and Fibrositis. Bernard Langdon Wyatt, M.D., F.A.C.P. Director, The Wyatt Clinic, etc. 201 pages. Illus. Price, $3.50, cloth. Baltimore: Wm. Wood & Company, 1933.

Calcium Metabolism and Calcium Therapy. Abraham Cantarow, M.D. Instructor in Medicine, Jefferson Medical College, etc. 252 pages. Price, $2.50, flexible binding. Philadelphia: Lea & Febiger, 1933.

The History of Dermatology. Wm. Allen Pusey, A.M., M.D., LL.D. Professor of Dermatology Emeritus, University of Illinois, etc. 223 pages. Illus. Price, $3.00, cloth. Springfield, Illinois: Charles C. Thomas, 1933.

CLINICAL DIETETICS; A TEXTBOOK FOR PHYSICIANS, STUDENTS, AND DIETITIANS. Harry Gauss, M.S., M.D., F.A.C.P. 490 pages. Illus. St. Louis. Mosby, 1931.

This is a rather interesting text dealing with the problems of diet. There is a brief historical sketch, followed by a reasonable classification of foods and diets, and a brief study of digestion.

There are numerous diet tables for special conditions, with many sample diets. No especially new information is included in the text, but it can well serve as a reference book and should be especially useful to those engaged in compiling diet lists. It should also improve the physician's knowledge of dietary principles.

L. R. Critchfield, M.D.

OFFICE SURGERY — Fenwick Beekman, M.D. 402 pages, 94 illus. (Everyday practice series—Edited by Harlow Brooks, M.D.) Price: $5.00. Philadelphia and London; J. B. Lippincott Co., 1932.

This is the tenth volume in this series, designed to "furnish the reader with usable, modern, authoritative monographs" on various practical subjects. It is written conservatively and one of its best features is the frequent reference to the necessity for hospitalization in cases beyond the scope of office treatment. On the other hand, it contains much useful information which should prove of practical value to those who are interested in doing such surgery as can be properly undertaken in the office. Appropriately one-fourth of the book is devoted to the various infections encountered in office practice and the section on fractures is especially well done.

Diagnosis throughout is emphasized and good judgment has been used in the selection of methods of treatment advised.

Gilbert Cottam, M.D.

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XVI APRIL, 1933 No. 4

CARE OF THE INDIGENT*

METHODS AND PLAN OF OPERATION

A. F. BRANTON, M.D.
Willmar, Minnesota

IN this day when the medical profession is being confronted with so many problems, with the reports of this commission and that committee which tend to upset its happy equilibrium, with collections at a low ebb and the numbers of sick who are unable to pay for medical services, yet must have such care, rapidly increasing, we in the profession are faced with problems in our relations to the poor.

In the past the medical profession, as part of its duty to the community, has gladly taken care of the poor without charge; today this is impossible. Just who are these poor, indigent or paupers? The words are considered to have the same meaning in legal parlance.

The definition, according to our State Attorney-General's office, is: "one who is in need of any or all of the commonly recognized necessities of life as: food, shelter, clothing, medical or surgical attention, etc., and one who is unable to provide the same for himself." Kindly note the emphasis on "any or all." It is also one of the specific duties of a government to care for anyone coming under the above definition.

Today people are divided into three classes: (1) those who can fully pay for their medical care—the self supporting group; (2) those who can still provide food, shelter, or fuel, but are unable to pay for medical and surgical attention —the near indigent group; (3) those who are entirely dependent for all necessities of life—the indigent group. You will therefore note that the above definition of the poor includes the second group of people, or the near indigent as classified above, and the financing of the medical care of this group is therefore a problem for the local government.

In the short time available, I can but hurriedly mention the various methods used in caring for the poor in this State, leaving out entirely a discussion of the state laws, as I do not feel that this is included in the subject assigned me. I shall mention certain plans that have been worked out elsewhere, and briefly offer some recommendations for improving the situation.

While it is true that in this emergency resulting from the depression we are confronted with serious problems, I believe that the foundation should be laid now for the study and development of insurance plans and contracts to apply in the future to the care of the poor.

METHODS USED IN THE CARE OF THE POOR

1. In our State, emergency work may be performed by any doctor at any time without notification or permission from the proper authorities and the doctor is reimbursed for the assistance given. This service is limited strictly to immediate first aid and it is understood that if future care is to be given such a patient, authorization must be made by the proper authority.

2. In some of the smaller towns and cities of the State, certain officers are delegated to oversee the care of the poor. In such places the governing body may designate one or more local doctors at fixed salaries to do the work on a part time basis. In Willmar, all the doctors of the city have signed an agreement to do the city work for 50 per cent of the minimum fee schedule. Some other percentage basis is in effect in other localities with the definite under-

*Presented at the meeting of secretaries of the Minnesota State Medical Association, St. Paul, February 18, 1933.

standing that all work performed must be authorized beforehand by the proper authorities.

3. In the counties where the township basis prevails the officers of the town board may appoint one or more doctors to administer to the poor of that district for whatever fee is agreed upon by the two parties, or it may employ any doctor desired without specific agreement. Counties under this system may send the patient to the University Hospital and the county pays half of the hospital bill.

4. Counties under the county system are controlled by a Board of Commissioners, each commissioner having control over the relief of the poor in the district he represents. The commissioners may make contracts with one or more doctors for the care of the poor in the county. It is not compulsory that they do so, for any doctor may be employed without agreement for the regular or agreed fee. Eleven of the county medical societies in Iowa have entered into contract with the county commissioners to do all the work of the county for a specified yearly amount. Iowa has been a pioneer in this movement.

The Milwaukee County Medical Society has come forth with a new plan. It has formed an entirely new corporation outside the county society but which shall be fully under the medical society's control which plans to enter into a contract with the county and city officials to provide medical care to the poor and also the near indigent class by the payment of very small sums monthly by this class in the form of health insurance.

5. Large cities maintain hospitals fully equipped with medical and surgical departments and provide more or less adequate out-patient and hospital facilities which are generally manned by volunteer professional service.

6. The state provides certain free medical care to the poor. The University Hospital, originally organized for the care of the poor for teaching purposes, is rapidly changing its spots until today it is serving the state as a whole as a general medical center and admitting most anyone who so desires to go there and this represents a real problem to every doctor. The state also maintains free medical care for the crippled children, the deaf, dumb and blind and also for the insane and the tuberculous. It also furnishes free diphtheria antitoxin, sliver nitrate, salvarsan, radium and other drugs for those who need it. It furnishes free laboratory service in many ways.

The state Soldier Welfare Fund provides medical care in certain cases of urgent need. The National Government is providing free medical care to any veteran whether indigent or not, as well as disseminating free medical advice far and wide.

Thus we see that laws provide for the medical care of the poor and the machinery has been set up for their administration.

Again returning to my original statement that the physician is confronted with many problems, I enlarge upon that thought to say that today he is as though sitting in a boat in a whirlpool and has became dizzy. He does not know which way to jump in order to find a safe foothold. The situation therefore demands sane, sensible leadership in the medical profession by those with a foothold secure on a rock from which to view the surroundings with judgment serene, alert, and progressive.

What plan of operation shall we adopt? It is my personal opinion that if every doctor in this state fully understood the laws that govern the care of the poor, a high percentage of the problems would be solved. We have the laws, the set-up is here, but we do not know how to use it.

The coming year our medical societies should undertake to inform every one of the members in regard to these laws, so that he may be sure of his ground when he approaches a Government agency, and can quote the laws as they are.

While there are many fine methods being propounded for the care of the indigent by insurance, county contracts, and some indefinite plans indicated by the Committee on the Costs of Medical Care, nevertheless, the problem is for today as well as tomorrow, and many of our bills for the care of the poor would have been paid long ago had the doctors of this state known what procedure to take, what their rights are under the law, who is entitled to care and who is charged with such responsibility. I know where a group of doctors in one county collected $1,900 for one case, after the issuing of the "questions and answers" on the care of the poor and after the case had been charged up to gratis service.

Another unfortunate circumstance is the fact that in most cases those who are charged with administering the law are as ignorant of these

laws as the doctor himself. To educate both would be ideal. However, the doctor by knowing these laws and cultivating the friendship of those in charge of government units can do much in the way of education. If the government official knows the law, he can then face the voters who put him into office without fear of criticism when he allows cause for widening of the field of medical care to the indigent under his jurisdiction.

Success in the handling of the medical care of the poor is dependent upon a united medical fraternity so closely bound together that an offensive educational campaign can be promulgated among the doctors themselves and among the officials of the government so that the doctors themselves will be able to benefit to the fullest extent now provided by law. Great responsibility lies on the shoulders of the medical societies and their leaders. The elimination of petty professional jealousy, and frankness with one another, should show the public that we are solidly united and are simply demanding that we be treated the same as a grocer or other merchant in respect to services rendered the poor.

CONCLUSIONS

1. The problem of the care of the poor is increasing and must be met.
2. The word pauper with its attached stigma and the necessity of one's declaring himself a pauper in order to receive medical care should be eliminated. If this were done it would result in many asking and receiving necessary medical care, particularly in the near indigent class.
3. The numerous plans offered for providing medical care to those unable to pay for it should not be hastily adopted but present provisions should be utilized to the fullest extent.
4. It should be insisted that government institutions adhere to their original purpose of caring for the indigent.
5. The medical profession should become informed as to the laws providing for medical care of the poor so as to know how to apply them.
6. Concerted action on the part of the component medical societies is necessary both for self enlightenment and in order to present a united front in matters pertaining to the care of the indigent.

SURGICAL CONSIDERATION OF CEREBRAL LESIONS*

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THE progress made in the localization and surgical treatment of tumors of the brain represents epochal accomplishments in the field of scientific medicine. Keene gives Bennett of London credit for accurately localizing the first cerebral tumor removed by Godlee in 1884. From a review of the early literature, it would appear that those surgeons were more interested in devising ways, means and instruments for opening the skull than they were in developing technic for the removal of tumors. But as surgery has advanced, refinement in both diagnosis and technic has been accomplished. Much credit is due Cushing and his contemporaries for standardizing procedures of examination and operative technic. The well-trained neurosurgeon of today is more concerned with the surgical indications, types of tumor, and the resection of tumors than he is with the performance of a craniotomy.

Although the profession is aware that cerebral tumors exist and that they are completely or partially removed, that cysts are evacuated and decompressions done for the relief of pressure, many physicians are still inclined to regard the condition as hopeless, or attempt to treat headaches, visual difficulties and the gastric symptoms as if they were caused by lesions of individual organs, thus failing to recognize the symptoms of increased intracranial pressure so frequently produced by cerebral tumors.

In making a diagnosis of an organic intracranial lesion, it is extremely important to proceed in an orderly fashion. The history should be carefully taken, and physical, neurologic, ophthal-

*From the Section on Neurologic Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Potter County Medical Society, Amarillo, Texas, April 13, 1932.

mologic and radiologic examinations, in addition to the laboratory tests, should be made as a routine. It is not wise to rely on special tests, such as ventriculography or encephalography, to the exclusion of evidence elicited in the course of the standard examinations.

A carefully taken history discloses the relationship between the cause of the chief complaint and other physical states, and often makes it possible to classify the disease in one of the large groups of organic disorders. General examination further assists in this classification and reveals coexisting diseases. Neurologic examination, carefully performed, discloses the mental status, abnormal reflexes, and motor and sensory paralysis. Ophthalmologic examination reveals abnormal or pathologic states of the visual fields and ocular fundi, such as paralysis, papilledema, optic neuritis, optic atrophy, and defects in the fields. These data aid in confirmation of the neurologic manifestations. Roentgenologic examination, which involves the making of plain and stereoscopic plates, demonstrates erosion, destructive and inflammatory lesions of the skull, and deposits of calcium in neoplasms and vascular lesions.

The special laboratory tests necessary in the individual case depend on the data in the history and on the physical and neurologic manifestations. Urinalysis and examination of the blood should be done as a routine. Spinal puncture and examination of spinal fluid are indicated in cases of trauma and of inflammatory lesions; occasionally, also, in circulatory and neoplastic conditions. These procedures reveal the presence or absence of blood in the cerebrospinal fluid, the intraspinal pressure, the presence or absence of organisms, and furnish valuable information concerning protein content of the fluid and the number and morphology of the cells it contains. In suspected syphilitic and parasitic lesions, the serologic reaction offers material assistance in arriving at a diagnosis. Spinal puncture is contraindicated in the presence of increased intracranial pressure due to brain tumor, or in the presence of papilledema with choked disk of more than 2 diopters. Special examinations of blood by cultural or chemical methods are indicated in inflammatory conditions; other laboratory tests may be necessary, depending on the coexisting diseases.

Encephalography is of value in demonstrating convolutional destruction and atrophy, as observed in traumatic and circulatory disease, but is rarely indicated, and may be a dangerous procedure, in neoplastic conditions.

Ventriculography has become a widely used and valuable procedure in the localization of tumors early in their growth, or when they are situated in a silent area, but it should not be employed promiscuously, or permitted to replace careful neurologic and ophthalmologic examination.

SYMPTOMS

At the onset, the symptoms usually are those of increased intracranial pressure, but sooner or later localizing signs develop. Occasionally, the tumor may be situated in a silent area and may never give localizing symptoms. It is in this group, and in the early stages, when localizing symptoms are not present, that ventriculography is indicated. Symptoms of increased intracranial pressure consist of headache, projectile vomiting, and choked disk. The ambulatory patient often has headache in the early morning, awakening him from sleep. As the symptoms of pressure increase, the bursting type of headache, without relation to taking of food, becomes more or less continuous. Vomiting is of the projectile type, and is associated, often, with movements of the head. Stiff neck and rigidity frequently are associated symptoms when the neoplasm is situated below the tentorium. Papilledema, or choked disk, usually accompanies the other two symptoms, but it may appear late, and may even be absent when tumors are in the frontal lobe.

Localizing signs develop by direct involvement, or by indirect involvement from pressure and displacement of brain tissue. These symptoms usually follow those of increased intracranial pressure, but they may arise primarily when the neoplasm is situated cortically or in an intracranial nerve. Numerous syndromes of tumor may develop, depending on the position of the tumor. An attempt will not be made to describe the various syndromes; suffice it to say that localization of a tumor of the brain requires careful analysis of the history, and of the physical, neurologic and ophthalmologic features, and that it is necessary to bear in mind the cerebral centers, the nuclei, and the pathways. Irritation of cortical motor centers gives rise to convulsive movements whereas destruction produces paraly-

sis. Involvement of the left frontal lobe disturbs the power of cerebration and changes personality. Interruption of the optic pathways produces hemianopsia. Extension into the temporal and parietal lobes alters stereognosis and the sensory manifestations.

Tumors of the brain stem and pons produce bilateral symptoms as do lesions of the corpus callosum. Involvement of the cerebellar lobes produces ataxia. Tumors of the cerebellopontine angle produce palsy of cranial nerves in addition to symptoms of cerebellar disturbance and increased intracranial pressure. Tumors of the pituitary body produce specific metabolic disorders; they also produce erosion of the sella turcica and hemianopsia.

DIFFERENTIAL DIAGNOSIS

In distinguishing cerebral tumors from other cerebral lesions producing similar symptoms, it is found that inflammatory lesions of the brain and the meninges are either nonsuppurative or suppurative. Nonsuppurative lesions may be localized or they may be diffuse, involving the cortical, the subcortical, or the nuclear regions; they may be syphilitic, tuberculous, fungoid or streptococcic. Again, the history and the results of general examination aid in arriving at a diagnosis. Coexisting diseases may be revealed, or the history may be significant of short duration and rapid progress of the condition in the absence of vascular abnormality. Spinal puncture and examination of spinal fluid will reveal serologic and cytologic changes. Suppurative lesions accompany similar lesions in other parts of the body. They may extend directly to the meninges and the brain from such regions as the frontal sinuses and the mastoid cells, or they may be caused by transportation of organisms by the blood stream. They may arise, also, from direct introduction of infected material when the skull is injured. If the infection is limited to the meninges and the subarachnoid spaces, meningitis develops, with the usual rise in temperature, leukocytosis, stiff neck, positive Kernig's sign, violent headache, coma, and semiconsciousness. If the condition persists, papilledema may develop, and cerebral involvement with ocular palsy may ensue. Spinal puncture, followed by serologic and cytologic examination of the spinal fluid, is extremely important, since it will demonstrate marked increase in the number of leukocytes, and frequently the spinal fluid will contain the organism. Suppurative lesions involving the brain result, usually, in formation of abscesses. However, recovery from localized encephalitis may occur spontaneously, without suppuration taking place. Brain abscess may be single or multiple, depending on the mode of infection. If the abscess results from direct extension it is usually single; if it results from infection of the blood stream, it is usually multiple. The abscess arises from infective thrombi of the terminal vessels followed by necrosis. Suppuration and an attempt to wall off the region of suppuration by the formation of a capsule supervene. In the period of walling off, immunity is established and the leukocytosis subsides. If the abscess is small, recovery may take place by inspissation of pus and calcification; if it is large, there is danger of the capsule breaking and of further extension or rupture of the abscess into the subarachnoid spaces or ventricles, in which event death is inevitable. It is obvious that the time for surgical drainage is during the quiescent stage when the abscess is encapsulated.

The symptoms of a suppurative, inflammatory lesion of the brain are not unlike those of meningitis, for usually associated with the encephalitis is localized or diffuse meningitis, and, in addition to the signs of meningitis, there are signs of increased intracranial pressure such as headache, projectile vomiting, and papilledema. Moreover, there are signs of cerebral destruction and edema; that is, pathologic reflexes, and motor and sensory paralysis. These symptoms may subside somewhat as the abscess becomes walled off, but will not disappear until drainage has been instituted or until a small abscess has healed spontaneously.

CIRCULATORY DISTURBANCES

Cerebral embolism follows pulmonary and cardiac lesions and occurs suddenly, producing hemiplegia and, occasionally, diplegia. If the embolus is small, the paralysis may be very slight and recovery may take place. Cerebral thrombosis accompanies the general process of cerebral arteriosclerosis. It may affect one or more arteries of the brain, and may produce monoplegia, hemiplegia, or cerebral palsy of gradual onset, requiring perhaps hours and days to develop. Again, temporary recovery depends on collateral

circulation, and on whether or not an artery has actually ruptured proximal to the thrombus.

Aneurysm of a cerebral artery, or arteriovenous aneurysm of cerebral vessels, may be congenital or acquired, and if the sac is small may not cause symptoms. However, if the sac attains considerable size it will give rise to the usual signs of aneurysm, consisting of bruits and erosion caused by pressure, in addition to the signs of increased intracranial pressure and cerebral involvement characterized by palsy and pathologic reflexes. Horton called attention to a valuable sign in the diagnosis of arteriovenous aneurysm. He stated that if blood is withdrawn from either the internal or the external jugular vein it will be found that the oxygen content of the blood is higher and the blood much pinker on the side of the aneurysm than on the normal side.

Subdural hematoma arises occasionally from trauma or strain that has suddenly increased the blood pressure; as a rule, it is the result of rupture of small arteries between the arachnoid and the dura. The hemorrhage may be sudden and severe, giving rise to a large clot, which will produce symptoms of increased intracranial pressure, together with those of localized pressure on the brain; or the hematoma may form slowly, bleed from time to time, and produce a laminated diffuse clot, often referred to as "pachymeningitis hemorrhagica." A similar lesion may occur between the arachnoid and the pia mater.

Cerebral arteriosclerosis, involving the terminal vessels, results in convolutional atrophy and is capable of producing mental deterioration and palsy. Headache and giddiness are common symptoms, unassociated with evidence of increased intracranial pressure. Nuclear symptoms may develop from a similar cause and may give rise to palsy and incoördination; painful sensations may develop in peripheral parts of the body, corresponding to the thalamic region involved.

CLASSIFICATION OF TUMORS

Tumors of the brain may arise from the cerebral tissue, or they may develop secondarily as metastatic growths. Primary tumors develop from the meninges, from the intracranial portions of cranial nerves, and occasionally from the blood vessels. However, the greatest number arises from the substance of the brain.

Cerebral tumors might be classified further as circumscribed, encapsulated, or as infiltrating, and diffuse. It is obvious that encapsulated tumors lend themselves to surgical removal more readily than do nonencapsulated tumors; however, it is possible to resect a few of the nonencapsulated tumors which are situated in silent areas of the brain, when the brain can be removed with the tumor without producing paralysis. More often, however, partial removal, or removal of the necrotic or cystic material, and decompression, have to be resorted to.

Meningiomas.—These represent the large operable group of cerebral tumors. They are fibroblastic and are sometimes referred to as dural endotheliomas, psammomas, or hemangioendotheliomas. They usually arise from arachnoid villi and are most often situated along the large sinuses of the cranial cavity. They are distinctly encapsulated and do not invade the brain but displace it. Their growth is slow and often requires many years to produce symptoms. They invariably produce proliferation of bone in the immediate vicinity and frequently tumor cells are found to invade the hypertrophied area, which offers material assistance in localizing the growths by roentgenographic examination. They can usually be removed completely unless situated in an inaccessible place; with the aid of the electrosurgical knife many more tumors are removed now than formerly. It is essential that the overlying meninges, as well as the invaded bone, be removed to avoid recurrence. Occasionally, malignant changes develop and the tumor recurs. Unfortunately these tumors respond poorly to radiotherapy.

Perineural fibroblastomas.—These tumors arise from cranial and spinal nerves. The most common site is in the cerebellopontine angle arising from the eighth nerve, in which situation it is referred to as acoustic neuroma. These tumors also grow slowly and make their appearance in adult life as do most of the meningiomas. They are distinctly encapsulated and produce symptoms by pressure displacement rather than by invasion. The early symptoms consist of tinnitus and progressive deafness. As the tumor grows, additional palsy of the cranial nerves develops, with adjacent cerebellar symptoms such as facial paralysis, impairment of sensation of the face on the same side as the tumor, diminished reflexes, nystagmus and ataxia, and the late development

of symptoms of increased intracranial pressure. Occasionally these tumors can be removed in toto, but usually it is unwise to attempt such a procedure because of the accompanying trauma to the adjacent cranial nerves. Hence, intracapsular enucleation is the operative procedure of choice. Such removal usually produces a satisfactory result since many such tumors have either partially or totally undergone mucoid or fatty degeneration which represents more or less complete differentiation and reduces the likelihood of recurrence. It is impossible to expect any return of hearing, but one can anticipate functional recovery of other cranial nerves and cerebellar symptoms. These tumors resemble the meningiomas in that they respond poorly to radiotherapy.

Gliomas.—These represent the large group of infiltrating, nonencapsulated tumors of the brain. They may occur at any age and in all parts of the brain. Since their general behavior varies as to growth and degeneration they have been classified into various groups such as the astrocytomas, which represent a slowly growing process with a tendency completely to differentiate into formation of cysts, permitting the evacuation of cystic contents and the removal of tumorous nodules in the wall of the cyst, thus effecting cure.

Oligodendrogliomas.—These tumors likewise grow slowly; they remain more or less circumscribed and often contain deposits of calcium which supply roentgenographic information as to size and position. If these tumors are situated in silent areas, in the frontal, temporal, occipital lobe or in the cerebellar lobe, radical resection is justifiable, but if they involve the motor cortex, internal capsule, basal ganglion, stem or pons, an attempt at radical removal is unwarranted. Even though successful removal is possible I believe that most patients would rather live for a shorter period with temporary relief than live for an extended period in a hopelessly hemiplegic state.

Spongioblastomas.—These tumors grow rapidly and are vascular. They are capable of producing multiple implants in other areas of the brain and cord. One would perhaps be justified in attempting radical removal only when the tumor is situated in such an area of the brain that would permit removal of the lobe without producing additional paralysis. These tumors are like the medulloblastomas but differ from the astrocytomas and oligodendrogliomas since they respond favorably to radiotherapy. I doubt if it is ever possible to effect cure by radiotherapy, but the temporary relief obtained may extend over several years.

Medulloblastomas.—These as well as other mixed and undifferentiated blastomas grow rapidly and are usually situated in the vicinity of the pons, medulla and brain stem. Their position and malignant character limit surgical treatment. Partial removal of these tumors situated in the fourth ventricle may result in decrease of intracranial pressure and thus give temporary relief. Again radiotherapy offers temporary additional symptomatic relief.

Ependymomas, pinealomas, cholesteatomas, dermoids.—These and similar tumors represent a group of encapsulated tumors which can often be removed, depending on their size and exact position. Most of these present roentgenographic shadows which aid the neurologic data in the localization of the growths.

Pituitary tumors.—These represent a group of neoplasms arising from the three primary structures of the pituitary gland. The chromophobe adenoma is usually responsible for the hypopituitary syndrome whereas the chromophile adenoma is found in cases of hyperpituitarism. Tumors of the craniopharyngeal duct arise from Rathke's pouch. All of these and other variations of pituitary tumors are capable of enlarging the sella turcica and producing suprasellar extensions. They usually produce some form of hemianopsia of which bitemporal hemianopsia is the most common visual defect, but it is obvious that the position and extent of the growth will vary these observations from time to time. They rarely produce papilledema but frequently give rise to optic atrophy preceded by pallor of either side of the margin of the disk. Choked disks develop only when the tumor extends upward and posteriorly into the third ventricle, resulting in block of one or both foramina of Monroe, and the most common tumors to produce such symptoms are those of the craniopharyngeal pouch. Although enlargement of the sella turcica is considered a pathognomonic sign of pituitary tumor it cannot be relied on as an absolute sign since the posterior clinoid processes, and even the sella turcica, may be eroded in the presence of increased intracranial pressure from cerebral tumors in other positions. Therefore, the diag-

nosis of tumor of the pituitary body is usually based on hypopituitarism and hyperpituitarism plus enlargement or erosion of the sella turcica, visual defects and changes in the ocular fundi. Many of these can be removed by the intracapsular method.

RESULTS

The results of surgical treatment depend on the character and situation of the tumor and the technic employed. It is obvious that there is a large group of inoperable tumors, but many tumors can be removed, others can be resected and many patients can be relieved temporarily by decompression and irradiation. Thus every patient with a cerebral tumor is entitled to careful examination, and operation if there is reasonable assurance that the tumor is accessible.

CARCINOMA OF THE ESOPHAGUS*

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CARCINOMA of the esophagus presents an important problem in medicine because of its relative frequency, extreme seriousness and therapeutic difficulty. Guttman and Held[1] asserted that from 5 to 7 per cent of all cancer found in man are in the esophagus. Clayton[2] in 5,900 necropsies at the Philadelphia General Hospital discovered 812 cases of malignant conditions of which 5.05 per cent involved the esophagus. Portis[3] believed the per cent to be as high as 20 per cent, but a fair estimate would probably be between 5 and 12 per cent, which puts it next to carcinoma of the uterus, breast and stomach in frequency. Its seriousness is emphasized by the fact that the condition carries practically a 100 per cent mortality, there having been few five year cures and only ten successful surgical removals.

There have been numerous reported attempts at removal of carcinoma of the esophagus since the unsuccessful attempt by Rehm in 1898, with only four apparent successes; one by Torek,[4] one by Lilienthal[5] and two by Eggers.[6] Gluck[7] has carried out radical operative procedures on 114 cases of cervical cancer of the esophagus with six well after five years. Garre[8] and Turner[9] each report a similar case with ten year cures. Graham and Ballon[10] in their review show that there have been no successful removals of the lower third by the abdominal route.

As the patient is always seen late, because the symptoms do not develop before the condition is far advanced, procedures directed toward palliation are the only therapeutic measures at the physician's disposal. Gastrostomy is advocated by Jackson,[11] in early cases, by Robson,[12] and Kreuscher[13] and others, but carries a high immediate mortality and the average duration of life is about six months and is at best a sad and unhappy means of palliation. Radium is advocated strongly by Guisez[14] and Hill[15] but has not been of much value in the cases of Stone[16] and Ernst[17] who are applying radium with much less frequency. Graham and Ballon[10] think the condition might better be treated if radon seeds were inserted into the periphery of the growth in addition to the intra-alimentary use of radium. As the wall of the esophagus is usually deeply involved it seems impossible that all the tissue could be radiated. Wood[18] states, "the results are palliative only and the danger of causing perforation and an empyema or mediastinal suppuration are great." X-ray has also given disappointment even in the hands of excellent men. Jackson[11] has warned against the use of X-ray in far advanced cases as it increases toxemia and shortens life. Surgical diathermy has been used by Galloway[19] in two cases of cervical esophageal carcinoma with poor results. The English have used intubation with the Symonds, Souttar or de Pezzei tubes with some palliation in lesions of the middle third. Recently Murray[20] reports its good use. Nine patients were able to return to work for periods ranging from three to ten months and were provided relief from dysphagia and mucus in the throat.

The most simple, most economic, most practical procedure, and the one associated with little risk is dilatation as used by the Plummer and

*From the Arrowhead Clinic, Duluth.

Sippy method. This procedure accomplishes all that one can obtain in a palliative way, although not prolonging life materially. The blind method of dilatation as used by Jackson without the esophagoscope is hazardous and should be avoided. Danger of splitting during dilatation is around .89 per cent in the hands of Moersch[21] and Vinson.[22]

At St. Luke's and St. Mary's Hospital there have been registered, since 1923, twenty-six cases of unquestionable cancer of the esophagus. Of these twenty-six, it has been possible to trace twenty-four to the date of death and the other two have unquestionably died. These cases constitute the basis of this study from the standpoint of age, sex, symptoms, diagnosis, duration of life under various types of treatment, and necropsy findings in six cases.

Age.—The average age was 62.9 years, there having been two cases under 50 (both 45 years of age) and one over 80 (83). The remaining twenty-three were fairly evenly strewn between the ages of 50 and 80.

Sex.—There were twenty males and six females or a ratio of three to one, which is low in comparison to larger groups given in the literature. Vinson[22] gives a ratio of five to one.

Symptoms.—These had been present before medical consultation and diagnosis for an average period of seven months. The shortest period was two weeks and the longest two years. This emphasizes the far advanced state of the patients when they came for treatment.

Dysphagia was the primary complaint in twenty-four cases, having come on suddenly in three and gradually in twenty-one. After its onset it was a progressive and persistent symptom.

Associated with the dysphagia were the following complaints:

	Cases
1. Regurgitation of food	8
2. Cramping pains in the chest	5
3. Pain in the neck	2
4. Epigastric pain	2
5. Gross hematemesis	1
6. Tarry stools	4
7. Hoarseness	2
8. Pains in the arms	1
9. Gurgling sensation over the stomach	1

There were two cases of the so-called concealed types of cancer of the esophagus where there was no dysphagia even in the terminal stages of the disease. One patient died with the diagnosis being made at necropsy. This patient entered the hospital with an eight months history of epigastric burning, abdominal distress on eating meat and vegetables, hematuria, weight loss of 62 pounds and tarry stools. The carcinoma involved the middle third of the esophagus and was 8 cm. in length. Infarcts in the kidney explained the hematuria. The other patient gave a three to four months history of weight loss, weakness, loss of appetite, melena and a gurgling bubbling sensation over the stomach after swallowing but no dysphagia. The diagnosis of carcinoma of the lower third of the esophagus was made during routine gastro-intestinal X-ray. In neither case was there any suspicion of an esophageal lesion before necropsy and X-ray respectively.

In one case an appendectomy and cholecystectomy was done (elsewhere) five months after the onset of some mild dysphagia to solids with a pressure sensation in the throat. No X-rays were taken of the esophagus at the time. Immediately after operation, obstruction symptoms began so that the patient was only able to take liquids. Then a diagnosis of carcinoma of the esophagus was made. The dysphagia was of so mild a character that it was entirely disregarded as a symptom of esophageal disease. No history of gallbladder colic was elicited.

Weight loss was a prominent symptom in the entire group and ranged from 14 to 60 pounds with an average loss of 41 pounds. On physical examination emaciation was graded as 3 to 4 in ten cases, cachexia in two and profound dehydration in three cases.

Anemia clinically or on the basis of a red blood count was present in eleven cases. The lowest counts were around 3,500,000.

X-ray.—Films were taken at the hospital in seventeen cases with the diagnosis of carcinoma in thirteen cases and constriction or obstruction in the remaining four. In two cases with a lesion of the upper third of the esophagus X-rays could not be taken.

Tissue.—A positive diagnosis by tissue removed from the growth was obtained in seven cases. In one case the tissue was removed during dilatation, in five cases during esophagoscopy and in one case during abdominal exploration before gastrostomy. Six were squamous cells and one adenocarcinoma. It might be well to bring out here the fact that diagnosis of carcinoma of the esophagus should only be

made positively when tissue is removed for microscopic study. Some cases of benign stricture of unknown origin and even cardiospasm have been wrongly diagnosed and in one case that is remembered a gastrostomy for supposed carcinoma of the esophagus had been done many years before and the patient came to see why he didn't die. In this case there was a complete obstruction of the lower esophagus from a benign lesion. During dilatation small shreads of tissue sufficient for microscopic study are frequently obtained. Occasionally if one is pushed for a diagnosis an esophagoscopy is necessary to obtain tissue. Broders and Vinson,[23] and Moersch[21] report the cancers of the esophagus to be of high grades of malignancy.

Location of lesions.—In twenty-four cases it was possible to ascertain the exact location of the lesion by means of the X-ray, esophagoscopy, bougie dilatation or necropsy. Five were located in the upper third of the esophagus, seven in the middle third and twelve in the lower third. These figures coincide with those of Kraus-Ridder,[24] who reviewed 1,748 cases, and tend to change the conception that the larger percentage of the lesions are in the region of the bifurcation of the trachea.

Treatment.—Gastrostomy was done in twelve of the cases; in eight as the primary procedure and in four after a period of dilatation as long as eight months. In three instances dilatations would have been carried out but the thread could not be swallowed, so gastrostomy was resorted to. Vinson[25] has recently written an article limited to the problem of getting a thread down and attempts to clarify this difficulty, for as long as any fluid can enter the stomach a thread should pass.

Of the twelve gastrostomies there were seven post-operative deaths with a mortality rate of 58 per cent. Of the seven deaths one occurred suddenly eight days after operation from a probable pulmonary embolus, and therefore could be excluded from the list of direct operative deaths. In defense of this high mortality rate it must be said that all were far advanced cases before operation was performed. The five patients who survived the operation lived an average of 6.8 months (2 to 11 months). One who lived seven months eventually died of a tracheo-esophageal fistula with aspiration pneumonia. The cause of death in the remaining four could not be obtained but probably was of progressive inanition.

Of the seven patients receiving dilatation as a primary treatment, six have been traced. They lived an average of approximately seven months. Of the one not traced dilatations had been carried out over a period of four months and when last seen he was swallowing fairly well but was losing weight and growing weaker.

Only one patient received X-ray treatment alone. Six treatments were given. This patient died two months after the onset of dysphagia and one month after the onset of treatments. This, however, is no fair indication of the value of X-ray, for earlier treatment might have been more effective. Radium was used in one patient following gastrostomy.

Six patients received none of the above mentioned treatment. Of this group five have been traced. They lived an average of two months after being seen. One of these died in the hospital before diagnosis was made. Two cases were dismissed with the note that "nothing can be done at the present. Should obstruction occur gastrostomy is indicated." Both of these patients died within three to four months. One patient reentered the hospital in extremis and died that night. The other two died of starvation one month after diagnosis was made.

Duration of life.—The average duration of life after the onset of symptoms in the twenty-four traced cases irrespective of the type of treatment was a trifle over eleven months, which shows the rapid course of the disease.

Necropsy was obtained in six cases. Of these, four succumbed to aspiration pneumonia with beginning pulmonary gangrene, three from tracheo-esophageal fistula where the lesion was in the upper third, and one from perforation into the left bronchus where the lesion was in the middle third. One died of a broncho-pneumonia with the lesion in the middle third and one of starvation with the lesion in the lower third. Two of the patients who developed tracheo-esophageal fistulas as the terminal complication had hoarseness as an early symptom and this, therefore, should represent an ill omen in this disease. One case required a tracheotomy one month before death because of bilateral cord paralysis and severe laryngeal edema with obstruction. Death occurred one month later following the development of a tracheo-esophageal fistula with aspira-

tion pneumonia and pulmonary gangrene. The lesion had involved the recurrent laryngeal nerves.

Metastasis was not noteworthy in the cases at necropsy. One case had a large mass just below the diaphragm but distant glands and implants were not present. Text-books lead us to believe that carcinoma of the esophagus does not metastasize frequently, but Clayton,[2] in a review of necropsy material at the Philadelphia General Hospital, found it to occur in 75 per cent of the cases.

CONCLUSION

1. Cases of carcinoma of the esophagus are usually in a far advanced state when first seen, and the possibility of cure is usually a remote one. The more frequent use of esophagoscopy and X-ray in vague cases of difficulty in swallowing, in an effort to make an early diagnosis, is strongly urged. The hope of cure, in the early cases, rests in surgery, X-ray and radium.

2. As practically all cases have well advanced lesions when first seen, palliative measures only are at our disposal. Gastrostomy is occasionally imperative where esophageal obstruction is complete. Because patients are not submitted to gastrostomy until late, this operation carries a terrific mortality rate, longevity is not materially affected and it results in a miserable existence. In the five cases here reported those who survived the operation lived on an average 6.8 months.

The method of treatment best tolerated, and which is attended by the lowest mortality rate and economic burden is dilatation by the Plummer and Sippy method. In the group studied, patients survived an average of seven months.

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PRIMARY CARCINOMA OF THE LIVER

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PRIMARY carcinoma of the liver may be defined as a malignant change which may have its origin either from the bile ducts (cholangioma) or from the liver cells (hepatoma), and is usually found associated with cirrhosis.

When one considers the possible etiological factors that may have some connection with the disease, he is immediately thrown into a maelstrom of contradictions. Apparently the disease has little connection with climate, cases being reported from all regions of the globe. The incidence of the disease in some of the tropical countries is to some extent proportional to the degree of parasitic infestations found in these areas. These infestations, such as schistosomiases, result in cirrhosis which predispose the liver to malignant change.

The disease may make its appearance at any age. Griffith was able to collect fifty-seven cases of primary carcinoma of the liver in children ranging from one to sixteen years of age; Dansie collected twenty-three cases in children less than two years and three months old; Rolleston found thirty-two cases in children under ten years of age; while other authors report cases in all of the age decades. In an excellent article on primary cancer of the liver Yamagiwa reports the following distribution of the disease according to age decades.

	LIVER-CELL CANCER		BILE-DUCT CANCER	
AGE	Eggel	Yamagiwa	Eggel	Yamagiwa
1 to 10 years....	1	2	1	0
11 to 20 years....	2	1	0	0
21 to 30 years....	7	2	2	0
31 to 40 years....	12	5	2	0
41 to 50 years....	13	2	2	3
51 to 60 years....	28	9	1	4
61 to 70 years....	22	0	4	1
Over 70 years....	8	0	1	0
Not indicated....	0	6	0	7

It is of course evident that this disease, like other malignant changes, occurs most frequently after the fourth decade.

The disease is more frequent in the male than in the female. Yamagiwa finds an incidence of 80.9 per cent of hepatomas occurring in the male, while Eggel in his series of cases finds 68.4 per cent of hepatomas in the male. In the cholangioma group 50 per cent of the cases were in males according to Yamagiwa, and 42.9 per cent according to Eggel. Apparently the male is more disposed to the development of hepatomas as a result of exposure to those factors that precipitate cirrhosis. The development of cholangiomas shows almost an equal distribution between the male and the female, bringing from its controversial background the relationship of cirrhosis of the liver to the development of a malignant change.

It is questionable as to the rôle that heredity plays in the development of primary carcinoma of the liver. Maud Slye has been able to develop a strain of mice in which cancer occurs in a high percentage of the offspring. Occasionally in the reported cases we find a carcinomatous taint in the family history, while in one instance two sisters were found to have primary carcinoma of the liver.

Racial characteristics are of no great value in the etiology of the disease, with the exception of a somewhat higher incidence among the Chinese and the Africans, possibly the result of their more frequent exposure to parasitic infestation.

Pirre emphasizes the relationship of schistosomiases to cirrhosis in the development of primary carcinoma of the liver, showing the higher incidence of primary malignant change in those livers cirrhotic by virtue of infestation by this parasite.

Trauma probably plays no rôle in the development of the disease, but may be incidental to directing the patient's attention to an already existing condition. Likewise, there is no scientific basis for the belief that chronic alcoholism, excessive coffee drinking, etc., are factors in the production of this disease.

The symptomatology of carcinoma of the liver reveals no pathognomonic sign characteristic of the entity; it thus follows that the disease is difficult of clinical determination. The patient may present himself for various reasons, and in most instances his history is suggestive of cirrhosis of the liver. Many of them complain of gastro-intestinal symptoms with nausea, vomiting, anorexia, epigastric distress, flatulence and the

like. The symptoms may even suggest either gastric or gallbladder pathology. Loss of weight makes its appearance second to the gastro-intestinal distress. Constipation may be a predominant complaint in many instances, while in others the persistence of an alternating constipation and diarrhea causes the patient to consult his physician. The feeling of epigastric distress leads to the discovery by the patient of an epigastric tumor mass.

In many cases the disease progresses to the point of portal obstruction before the patient realizes the gravity of his condition. As the disease advances the signs of a wasting illness appear and cachexia, secondary anemia, etc., become more marked. At the onset of the disease few of the patients are jaundiced, but this finding makes its appearance in the course of the illness in sixty-one per cent of the cases. Seldom is it of marked degree. Because of portal obstruction ascites develops and is found in 58.5 per cent of the cases. Edema and even anasarca may develop during the course of the illness. Eggel, whose figures are quoted above, estimates that 41 per cent of the cases are edematous. Occasionally the ascites or the jaundice may be the only clinical findings of the disease.

Upon examination the liver is usually found to be enlarged and occasionally the tumor mass and the liver may be felt through the abdominal wall. Seldom, however, are conditions such that these masses may be palpated with any degree of surety. In a large number of the cases the mass is most frequently found in the right hypochondrium. In the far advanced cases the carcinomatous nature of the disease may be evidenced by the weight loss and cachexia. X-ray examination of the patient yields no positive diagnostic aid, but is of great value in ruling out any possible primary carcinoma in other parts of the body that may give rise to secondary involvement of the liver. Examination of the blood in the far advanced cases shows a secondary anemia comparable to that found in other malignant diseases. The icterus index is of value in determining the presence of latent jaundice. The urinary findings are of no significance. The stomach contents are usually negative, as are the stool examinations. Occult blood may be found in the stomach and stool in those cases where rupture of an esophageal varix has occurred. The tests of hepatic function will at times reveal the presence of liver damage, but are of no value in determining the malignancy of the condition. The ascitic fluid offers nothing in the way of diagnostic aid.

The diagnosis of primary carcinoma of the liver is therefore made by the process of elimination, in which we rule out all other hepatic conditions. Thus we might state that if we are confronted with a patient who gives a history suggestive of previous cirrhosis of the liver and who now evidences a down-hill course with a rapidly enlarging liver, cachexia, ascites, etc., we must consider primary carcinoma of the liver as a likely diagnosis. If by careful examination we are unable to find any evidence of a primary carcinoma of other organs that might furnish metastasis to the liver, we are safe in assuming that the malignant change is primary in the liver.

This disease has to be differentiated from syphilis of the liver, amyloidosis, echinococcic cysts, liver abscess, cirrhosis, pylephlebitis, and secondary carcinoma of the liver. In addition, we must differentiate the disease from multiple and diffuse adenomata of the liver.

There is of course no treatment for the disease, symptomatic treatment being given as the conditions present themselves. The surgical removal of part of the liver has been recorded by Yeoman with the patient alive at the end of a five year period. Schlimpert, Keen, Williams, and Freeman have also operated for the condition. In general the prognosis is poor and once the diagnosis is established it connotes a fatal termination. The course of the disease varies, but as a general rule the individual seldom lives longer than six months. Contributory factors often make the time of onset of the disease doubtful so that an exact estimate of the duration of the illness cannot be made.

The following two cases were seen on the autopsy services of St. Joseph's and St. John's Hospitals, respectively. The first case was a patient of the late Dr. Comstock and the second of the author.

W. C., a white male, aged forty-eight, married, entered the hospital May 15, 1930, with a diagnosis of Hodgkin's disease. The family and marital history had no significance in relation to this illness. His occupation was that of a railroad conductor. On admission to the hospital he complained of a mass in his neck, weakness, anorexia, constipation, jaundice of the skin, and loss of vision in the left eye. He stated that the mass in his neck was present for a year and that previous to this enlargement he had bilateral enlargement of the glands of the neck which had disappeared under X-ray treatment. Since the early part of 1930

the patient had been bedridden because of weakness. For several months previous to his admission to the hospital he suffered from anorexia and up to the date of admission he had lost seventy pounds in weight. Constipation had been present for some time and he had used cathartics in large amounts. Jaundice had been present for the last five weeks. The patient noticed that for the last three weeks his urine had been dark in color. For the past three months he had suffered abdominal pain that was most noticeable in the right upper abdomen, but which he did not associate with any chronological or physiological event. In January of 1930 he noticed blurring of vision of the left eye which was associated with a ptosis of the left lid. Physical examination revealed an acutely ill white male, in whom the positive findings were as follows: There was a ptosis of the left eyelid with a moderate degree of jaundice of the sclera and the skin. The mouth was practically edentulous except for several decayed teeth. On the left side of the neck there was a mass along the sternocleidomastoid muscle that extended from the posterior auricular area to the sixth cervical spine. The mass showed no evidence of suppuration and was of firm consistency. On the right side, the superior cervical glands were large, firm, and not tender. Examination of the abdomen showed the liver edge at the level of the umbilicus while the spleen extended four fingers below the costal margin. There were no palpable masses in the liver, but it was tender to palpation.

Laboratory examination. Urine negative. Biopsy of the cervical mass one year previously diagnosed as Hodgkin's disease. The patient died May 20, 1930, and the autopsy was performed by Dr. A. H. Pedersen at 10:30 a. m. of the same day.

Autopsy report was that of a white male five feet, ten inches in height, weighing 140 pounds. There was a generalized jaundice with postmortem rigidity and hypostasis present. Upon examination of the pleural cavities small carcinomatous plaques were found studding the pleura. Lungs were normal, except for a terminal hypostatic pneumonia of the right lung. Right lung weighed 720 grams, left lung 510 grams. The heart weighed 325 grams and the cardiovascular system was normal. The diaphragm was at the third interspace on the right and the fourth interspace on the left. Upon opening the peritoneal cavity the peritoneum was found smooth and shiny and about 200 c.c. of clear, straw-colored fluid was found. The liver was enormously enlarged, weighed 6,225 grams, and showed numerous large cystic areas filled with blood associated with scattered nodules that varied in color. The spleen weighed 200 grams and was normal in appearance. The adrenals were normal. On the dorsal surface the pancreas showed a small tumor mass about the size of a hazel nut that was in direct contact with the overlying liver mass. There was a small healed duodenal ulcer. The left kidney weighed 170 grams, the right kidney 180 grams. Microscopic examination revealed a primary carcinoma of the liver with associated cirrhosis of marked degree. The carcinoma had its origin from the liver cells and in some areas the transition of normal liver tissue into carcinomatous tissue was visible. The hepatic vessels and portal vessels contained thrombotic malignant tissue that had invaded the vessels by direct extension. The metastatic masses in the pleura resembled hepatic cells and were bile stained. The mass in the dorsum of the pancreas was also of biliary origin.

Autopsy diagnosis was primary carcinoma of the liver of the hepatoma type with direct extension to the pancreas and metastasis to the pleura. Old duodenal ulcer. Hodgkin's disease.

The second case was that of a seventy year old white female who was first seen at her home on August 21, 1931. At this time she complained of pain in the epigastrium of five weeks duration. Associated with the pain was a weight loss of twenty pounds which was most noticeable during the past three weeks.

The patient stated that she had been well until 1928, when she developed rheumatic fever. At this time her attending physician told her that she had an enlarged liver. Following the subsidence of the acute symptoms of the rheumatic syndrome her tonsils were removed. She then felt perfectly well until the early part of 1930, when she noticed vague epigastric distress. This distress came on after meals and was associated with the quantity of food taken and had no relation to the particular character of the food. This distress was intermittent and would last for two or three days, then would disappear only to recur two to three weeks later. At no time was the pain severe. About five weeks before the present illness a gnawing pain developed in the epigastric region and was present ever since its onset. The pain was becoming progressively worse and was definitely associated with increased intensity following a heavy meal. Because of the food distress she lost her desire to eat and as a result she lost about twenty pounds in weight. The rest of the history was essentially negative.

Physical examination revealed an aged woman who was anemic in appearance and who evidently had lost weight rapidly. Her temperature was 98 degrees, pulse 60, and respirations 16 per minute. Positive points in the physical examination were as follows: The eye grounds showed definite evidence of arteriolar sclerosis. The heart was enlarged to the left with a blood pressure of 150/90, but no evidence of adventitious heart sounds. There was a second degree procidentia with incompetent pelvic floor as well as a lacerated cervix. Upon examination of the abdomen a mass was found in the epigastrium about the size of an orange which was hard and painful, and which did not move with respiration. The liver edge was two fingers below the costal margin.

The patient was referred to the hospital as a suspected carcinoma of the stomach. While in the hospital she was completely X-rayed and no evidence of carcinoma could be found. Her laboratory reports were normal except for a mild secondary anemia. On August 26, 1931, the liver edge was four fingers below the costal margin and the spleen was palpable. A diagnosis of probable primary malignancy of the liver with an associated hypertrophic biliary cirrhosis was made.

Gynecological diagnosis was procidentia, lacerated cervix, and incompetent pelvic floor. Cardio-vascular diagnosis was hypertensive heart disease with cardiac hypertrophy. It was also felt that the rheumatic fever of 1928 probably produced some cardiac damage. The patient was returned to her home from St. John's Hospital and was under observation until her death on December 1, 1931. Following her return home the patient became much worse. The liver mass extended to the navel and on October 15th there was evidence of fluid in the abdominal cavity. Her hemoglobin was now 56 per cent. Her condition became progressively worse; anasarca appeared despite the use of diuretics. Jaundice made its appearance and the patient suffered two attacks of hematemesis, probably due to ruptured esophageal varicosity. On November 29th the patient became unconscious, the heart rate became 130 per minute with many extra systoles present. There was a soft systolic murmur at the apex. On November 30th terminal bronchopneumonia made its appearance, and the patient expired on December 1, 1931.

Postmortem examination was done at the undertaking parlor at 2:00 p. m. on December 1, 1931. The essential features of the autopsy were as follows: The heart was definitely hypertrophied and there was a pure stenosis of the tricuspid valve which was apparently rheumatic in origin. The kidneys were of the arteriolar sclerotic type. The liver was found to be enormously enlarged, extending down to the level of the pelvic brim, and weighed 4,200 grams. The right lobe of the liver contained a large, solid, white carcinomatous mass, while the rest of the liver was studded with carcinomatous masses of various sizes, color, and consistency. There were about five thousand cubic centimeters of straw colored fluid in the abdomen. The spleen was enlarged, but showed no evidence of malignancy. The rest of the organs were normal, and an exhaustive search of the body revealed no other evidence of malignancy which might be of a primary nature. On the superior surface of the pancreas was a small carcinomatous nodule which did not invade the pancreatic tissue, and which was contiguous to the masses in the liver. A detailed examination of the liver showed an extreme fibrosis with the liver being separated into adenomatous areas by the fibrous tissue. The lungs showed a terminal bronchopneumonia.

Microscopic examination showed the tumor masses to have arisen from the hepatic cells. In some areas a direct transition from the normal liver cells to the malignant type of cell was seemingly apparent. The vessels contained malignant thrombotic material, and the small nodule present in the pancreas consisted of hepatic cells. The tumor was therefore of the hepatoma group.

Consideration of primary carcinoma of the liver entails a discussion concerning its relationship with hepatic cirrhosis. The frequency with which cirrhosis of the liver is found in cases of hepatoma emphasizes that the cirrhosis is not a happenstance phenomena. It can be stated that in the hepatoma cirrhosis is always a constant finding, and in fact in its absence diagnosis of biliary malignant degeneration is difficult if not impossible to make. In addition, in those diseases which predispose to cirrhosis, as schistosomiases, there is a high incidence of primary carcinoma. When one considers the number of cases of cirrhosis of the liver it would be expected that a larger per cent of them should show a primary malignant change, yet the existence in all hepatomas of cirrhosis indicates definitely that the relationship is anything but coincidental. Some workers, such as Gilbert and Claude, believe that the cirrhosis is produced by the carcinomatous degeneration, but fail to furnish proof that would substantiate this contention.

For the proper concept in this cirrhotic relationship, we should recall, through the work of Von Podwyssowski, Jaeger, Mann and others, that the destruction of liver tissue causes the remaining portions of the liver to regenerate by a process of hyperplasia. Thus cirrhosis is a process of regeneration occurring in association with the liver destruction. As a result of this repair phenomenon, islands of liver tissue are isolated to form adenomatoid structures. In addition, scattered throughout this connective tissue formation we find areas of small bile canaliculi to which some authors attribute the power of forming hepatic cells. Although the liver cells and canaliculi have apparently the same embryological origin it is yet to be proven that the bile ducts can be transferred into liver cells. Theoretically, therefore, these adenomatoid structures can be considered as premalignant changes.

Von Heukelom, Goldzieher and Bokay demonstrate in the hepatoma formations the direct transition of the hypertrophic liver cords into the hepatoma type of change. Others, such as Herzheimer, feel that this apparent transition is the result of artifact production. Sweiden feels that these hyperplastic liver cells are definitely precancerous, and the consensus of opinion of most of the workers is that in the hepatoma, cirrhosis precedes the malignant change. In general, this belief is subscribed to by Eggel, Yamagiwa and many others. It is difficult to prove that the disassociated liver cells are precancerous in character, but it is reasonable to assume that the adenomatoid structures, produced by the cirrhotic process, are capable, by further irritation, of carrying this process of regeneration beyond its normal limits over into malignancy.

It is untenable that infestations of the liver

as primary etiological agents are capable of producing carcinoma; this, however, we must assume if we believe the cirrhosis to be secondary to the malignant change or that the two processes have a common etiological agent and develop as independent phenomena. The weight of evidence points to the cirrhosis as an important factor in producing precancerous changes in the liver, rather than the cirrhosis being secondary or coincidental in the rôle it plays.

The occasional frequency of cirrhosis in the cholangioma type of primary carcinoma of the liver leads us to suspect that here it is secondary to the malignant change. Apparently the tumor cells arising from the bile ducts have a desmoplastic character and by virtue of this power produce the fibrotic changes that are so frequently seen. Here also the fibrotic change may be an attempt on the part of the liver cells to repair the damage done by the malignancy.

The pathology of the disease has been discussed by practically all authors. As usual there are various descriptions and classifications which in the main result in further confusion of a difficult subject. From the gross standpoint Eggel divides the disease into three groups:

1. Nodular form, the new growth being in the form of nodules of various sizes scattered throughout the substance of the liver.

2. Massive form, one large mass of tumor often involving a whole lobe and sometimes associated with scattered nodules.

3. Diffuse form, in which the carcinoma is diffusely scattered throughout the liver.

Microscopically the tumor is to be differentiated anatomically as to the type of cell from which it takes its origin. By this classification we can divide tumors into either the hepatoma or cholangioma type. The arrangement that the cells may take can be used to classify the tumor further such as a carcinoma simplex, etc., but is of little practical value and often leads to great difficulties. In fact, at times the classification of the tumor into its proper anatomical type proves to be very difficult. In the cholangioma the cells tend to resemble those of the bile ducts, but are usually larger and are cuboidal or cylindrical in form demonstrating a tendency to alveolar arrangement with canaliculization. The most reliable criterion of differentiation between the two types of tumors lies in a study of the stroma; in the hepatoma the stroma is predominantly capillary. Here the cells may contain bile pigment and are oval to polyhedral in form with no characteristic change in cytoplasm or nucleus. Giant cells and rosettes may be present. In the hepatoma type we often find thrombotic material in the portal and hepatic vessels which by direct extension may extend back as far as the heart.

Extra-hepatic metastases may occur to the lungs, regional lymph nodes, etc., but they are few in consideration of the extensive invasion of the vessels that is so often present. Metastatic tissue of the hepatoma type according to Schmidt, Hanot and Gilbert may secret bile, but here again we meet with controversy as to whether this is characteristic of biliary carcinoma, for some attribute the process of bile secretion to those tumors having their origin from the bile ducts. Others feel that the presence of bile in the metastatic areas is an occlusion process rather than a physiological one.

The striking gross picture of this disease pathologically immediately brings up the question of the method of spread of the disease within the liver. Goldzieher and Bokay as well as Von Heukelom feel that the disease is multicentric in its origin; and if we believe the relation of cirrhosis to malignant change to be correct, we must assume that each of the isolated adenomatoid areas is capable of undergoing malignant degeneration. In contradistinction Ribbert, Heussi, Wegelin and many others feel that the disease is unicentric in its origin. Accordingly the malignant change arises in one area and the other nodules are therefore secondary as a result of invasion of the vessels by malignant thrombotic material, resulting in subsequent deposits of tumor tissue in the other parts of the liver. Unquestionably both theories have their merit, and it remains to be seen which will be proven correct.

SUMMARY

1. Two cases of primary carcinoma of the liver are reported, both of the hepatoma type.

2. Cirrhosis of the liver apparently is of significant import in the production of the hepatoma type of primary carcinoma of the liver.

3. The rapidly accumulating literature of this disease emphasizes that it is not an infrequent entity and should be suspected in those cases which exhibit evidence of malignant change in the liver without any extra-hepatic foci which might give rise to hepatic metastasis.

PITFALLS IN THE DIAGNOSIS OF RENAL TUMORS*

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Minneapolis

THE diagnosis of renal tumors is often long delayed with disastrous results. In some cases this is unavoidable, in some cases it is the patient's fault, but in some cases, unfortunately, it is the doctor's fault. Renal tumors, being deep-seated, always grow for a time before causing any recognizable symptoms. In many victims the growths are inoperable before the symptoms are sufficiently noticeable to call for an examination. One man reporting within six weeks of his first symptom was found to have a large fixed growth in the left kidney with a markedly enlarged supraclavicular lymph node; he died in a short time and autopsy showed metastases in lungs, heart, and omentum. A woman admitted to the hospital two days after the onset of the first symptom,

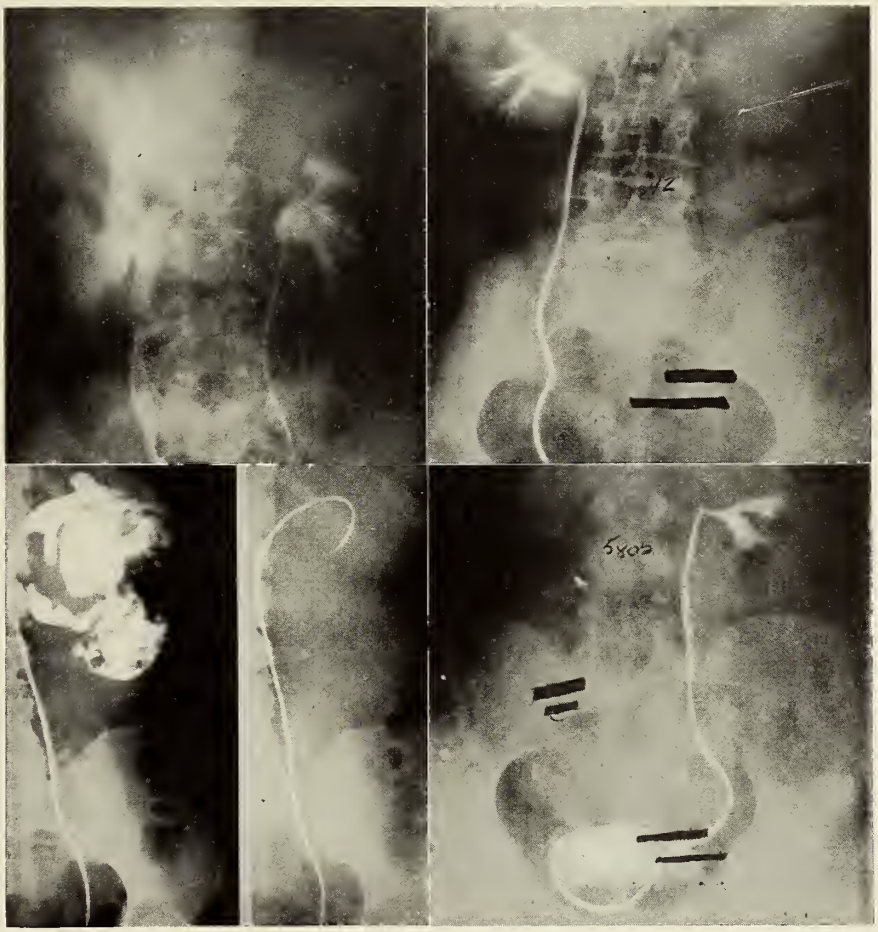


Fig. 1 (*upper left*). Pain for ten days only; hematuria for one day. Great enlargement and distortion indicate right hypernephroma; left side normal. Diagnosis proved by nephrectomy.

Fig. 2 (*upper right*). Pain and hematuria for five days only. Calices elongated and lower one broadened. Nephrectomy proved the diagnosis of hypernephroma.

Fig. 3 (*lower left*). Pain for two days only. At the right the preliminary film shows large mass with displacement of catheter upward and medially. Pyelogram shown at left demonstrates large mass communicating with renal pelvis; probably hypernephroma with degeneration; condition too poor for operation; autopsy refused.

Fig. 4 (*lower right*). Attacks of pain, hematuria, and fever began six months ago. Pyelogram three months ago was inconclusive,—some broadening of base of upper calices. Present pyelogram shows complete obliteration of upper calyx and of most of pelvis. At nephrectomy a large hypernephroma was found adherent to its surroundings.

*Read before the Southern Minnesota Medical Association, Rochester, Minnesota, September 12, 1932.

had an inoperable renal tumor and died within one month (Fig. 3). Occasionally a malignant renal tumor, which has given no symptoms at all, is found at autopsy, death having been due to



Fig. 5. Abdominal mass found nine months ago but disregarded. Calices are distorted and spread out over a rounded mass in lower pole. Diagnosis of hypernephroma proved by nephrectomy. Other kidney is normal.

Fig. 6. Abdominal mass found incidentally during examination. Diagnosis of solitary cyst made correctly from this pyelogram but with a reservation regarding possible tumor. Other kidney is normal.



Fig. 7. Same case. The cyst was opened for removal, and has been redistended over a toy balloon.



Fig. 8. Large acutely infected solitary cyst; no pyelography (H. B. Sweetser, Minn. Med., 12:786, Dec. '29); compare with last case (Figs. 6 and 7).

some unrelated illness. One such was found at the Minneapolis General Hospital following a fatal attack of lobar pneumonia.

In some peculiarly fortunate patients the renal tumor is found incidentally during examination or treatment of some other more obvious or acutely presenting lesion, and so is removed in time. In a boy eighteen years old, symptoms of perinephritic abscess followed an infection on his chin. When incision was made to drain the abscess he was found to have a hypernephroma in addition to the perinephritic abscess (Fig. 20). The kidney was removed and he has had no sign of recurrence or metastasis in the subsequent three years. Not many patients are so fortunate.

When a renal tumor presents its three principal characteristic symptoms—hematuria, pain, and tumor mass—the diagnosis may not be very difficult, and the prognosis is liable to be very poor. Some months or several years earlier, when the prognosis would have been much better, and when only one or none of the principal symptoms might have been present, the diagnosis would indeed have been difficult. At such a favorable time the one important symptom is sometimes disregarded by the patient. Sometimes, however, the symptom sends the patient to his doctor, and occasionally the doctor gives medicine or other treatment without adequate exami-

nation, the patient later being found to have an inoperable or less favorably operable renal tumor. A woman sixty-four years old went to her physician complaining of pain in the right side and was told that she had a tumor which would give her no trouble. Nine months later she came to us with another attack of pain associated with hematuria. Study demonstrated a hypernephroma (Fig. 5), and the kidney was removed. A man forty-seven years old consulted several doctors during a period of three years because of hematuria and pain in the left flank. They examined his urine, told him he had kidney trouble, and gave electric treatments and various medicines without apparently carrying out any further diagnostic measures. At the end of three years when we saw him, we were able cystoscopically to demonstrate the source of the hematuria and to show by pyelogram the distortion characteristic of tumor (Fig. 12). At operation the tumor (Fig. 13) was found to have invaded the perirenal fat, making the prognosis much worse than it would have been three years previously.

If we are to cure more patients with renal tumors, we must, without delay, make every effort to obtain an accurate and complete diagnosis in each patient complaining of hematuria, pain, or

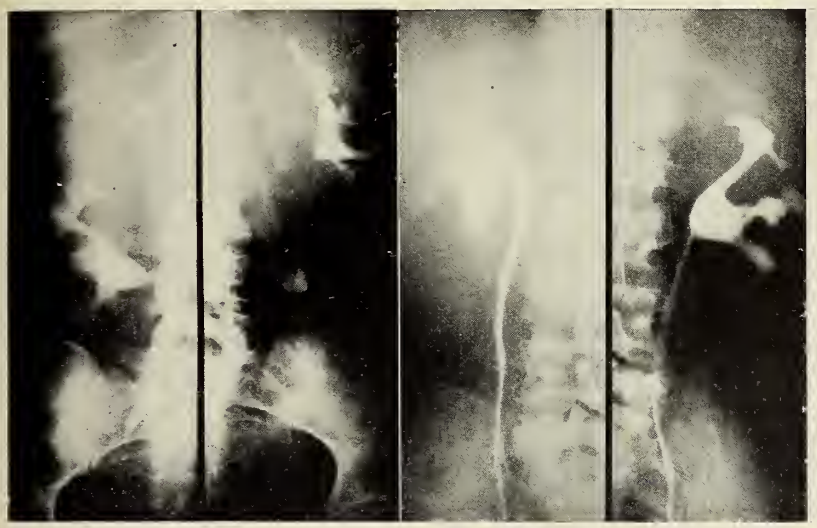


Fig. 9. Mass felt in left flank. Typical elongation of calices and peculiar curves indicate bilateral polycystic kidneys. The diagnosis leads to advice against operation.

Fig. 10. Came for weakness and loss of weight. Mass found in *right* flank. *Left* pyelogram is for comparison with preceding figures. Impression: probably bilateral polycystic kidneys with superimposed disease on right.



Fig. 11. Same case. At exploration the right kidney was removed showing hypernephroma. Three months later he had a pathological fracture of his arm. Died later. Autopsy refused.



Fig. 12. Hematuria intermittently for three years. Elongation and distortion of middle and lower calices on left indicate tumor.



Fig. 13. Same case. Nephrectomy demonstrated adenocarcinoma of kidney. (T.H.S., Minn. Med., 11:603, Sept. '28.)

tumor in a kidney region. One can never say just when metastasis or local extension will make a malignant tumor inoperable. Therefore the diagnosis should be established and the treatment carried out as soon as possible.

Most of us probably believe, as we were taught in school, that all diagnoses should be made by the method of exclusion. Yet, it is a rare man who *never* jumps at conclusions to his occasional discomfiture. A complete history and physical examination should be recorded for every patient at his first appearance. After that, any error usually lies, not in missing the significant symptom or sign, but in failing to appreciate its significance and in failing to follow up its discovery with the appropriate and well recognized special examinations.

Some of the special findings in cases of renal tumor are these. The X-ray film may show one kidney shadow much larger than the other. At cystoscopy we may see spurts of bloody urine coming from one ureter, or we may see no urine coming from that ureter. There may be obstruction to the passage of the ureteral catheter. Phenolphthalein or indigocarmine, injected intravenously, may be delayed in its appearance from the suspected kidney. The pyelogram may show distortion or obliteration of part or all of the pelvis or calices of one kidney, the pyelogram of the other kidney being normal. The interpretation of the pyelograms is often difficult; bilateral pyelography is usually advisable, and is fairly safe with the newer organic compounds of iodine used with reasonable care. Occasionally, when kidney function is poor, it is safer to make the two pyelograms at different times. It must be said in passing that pyelograms for accurate diagnosis of renal tumors should be made by means

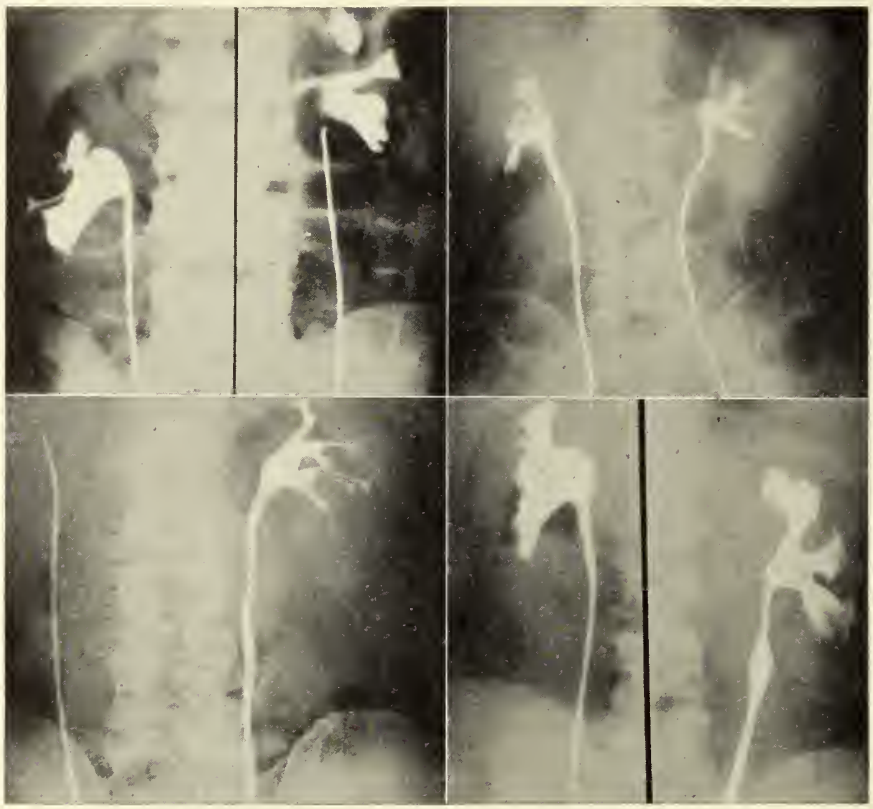


Fig. 14 (*upper left*). Pain for six weeks. Elongation of middle calyx and broadening of lower calyx indicate tumor of right kidney. At nephrectomy there was a hypernephroma with infection in it. Other kidney is incompletely filled.

Fig. 15 (*upper right*). First symptoms apparently were those of bony metastasis—diagnosed as metastatic hypernephroma. Note elongation of upper calyx on left side.

Fig. 16 (*lower left*). Came for pain in left flank. Bizarre elongation of calices led to diagnosis of probable renal tumor. Nephrectomy proved pyelonephritis but no tumor. Should have had bilateral pyelography, as the peculiarity was anatomic and probably bilateral. Patient has had no pain since nephrectomy.

Fig. 17 (*lower right*). The filling defect on left side is due to large non-opaque stone as proved at operation. Pyelogram did not absolutely rule out carcinoma of renal pelvis.

of ureteral catheters, preferably under fluoroscopic control, as sharp detail is necessary. The pictures obtained by the intravenous method are not usually sufficiently clear in detail for the diagnosis of the smaller renal tumors.

Such a complete urologic examination may

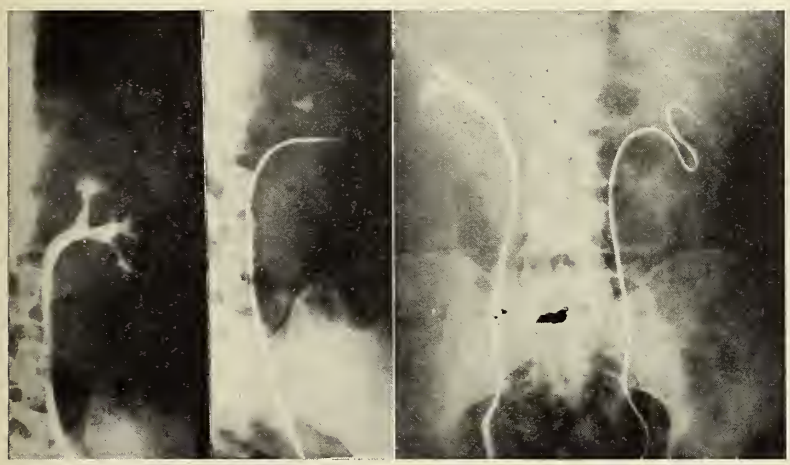


Fig. 18. Renal stone; preliminary film shown at the right. In the pyelogram shown at the left note filling defects due to papillomas of renal pelvis,—proved by operation.

Fig. 19. Swelling in right flank associated with pain and fever. Pyelogram probably shows upper part of a congenitally double renal pelvis, but renal tumor could not be entirely ruled out until operation. Perinephritic abscess was found.



Fig. 20. Hypernephroma associated with perinephritic abscess; found at operation for the latter.

sound formidable, but even at cystoscopy we must not jump at conclusions. Incomplete examinations are dangerous. At cystoscopy, done for hematuria in an elderly man, the diagnosis of enlarged prostate, probably carcinomatous, was made and the patient discharged. There was no record of ureteral catheterization or pyelography. Six months later the patient was admitted to the neurological service for hemiplegia and died. At autopsy the prostate was benign, but there was a hypernephroma with cerebral metastasis in which hemorrhage had occurred. At cystoscopy, done for hematuria in another elderly man, blood clots found in the bladder were assumed to come from the prostate; suprapubic cystotomy was done and a prostatic median bar resected; later it was found that the bleeding had come from a benign papilloma in the right ureter. Still another elderly man was referred to a genito-urinary surgeon for prostatectomy; he had a large congested soft prostate with a moderate amount of residual urine containing blood. It was felt that the blood came from the prostate, but cystoscopy was done to be certain. To the surprise of all, the blood was seen to come from one ureter, and

further study demonstrated a malignant renal tumor.

The accompanying pyelograms illustrate deformities, caused by renal tumors and by some other lesions that may cause confusion.

It must be recognized that occasionally nephroma can not be completely ruled out even by exhaustive study without exploratory incision. If still in reasonable doubt after a complete study, then exploration should be done with a willingness to stop short of nephrectomy should the findings warrant it. One man with hematuria presented an enlarged right kidney, bloody urine from the right ureter, and a minor distortion of the right pyelogram. Exploration revealed no tumor, but a granular pyelitis and congenital abnormality of the pelvis, and the wound was closed without nephrectomy. Other cases explored because of some doubt after study are shown in Figures 16, 17, and 19.

Conclusions.—To secure earlier diagnosis and consequently improved prognosis in cases of renal neoplasm we must make adequate examinations in cases showing hematuria, renal pain, or tumor mass. Unless the diagnosis is perfectly evident, especially in cases of hematuria, we should make a complete urologic study including bilateral pyelography by the retrograde (catheter) method. If there is still real doubt, an exploratory operation may be occasionally necessary, though every effort should be made to complete the diagnosis before operating.

THE NEW SURGERY OF BLADDER NECK OBSTRUCTION*

IMPROVED INSTRUMENTS AND METHODS

REVIEW OF CASES

FREDERIC E. B. FOLEY, M.D.
Saint Paul

AT the May meeting of the Academy last year I first presented to you the subject which is to be elaborated upon tonight: The New Surgery of Bladder Neck Obstruction. The instruments which were exhibited at that time have been greatly improved and the operative technic has been further perfected. Since the time of my last presentation, the instrument and method have been employed in a considerable number of cases. These and the cases operated upon by other transurethral methods will be reviewed to show my experience during the past year with "The New Surgery of Bladder Neck Obstruction."

In 1927, at a meeting of the Twin City Urological Society, I first expressed the ambition to convert prostatectomy into a relatively minor transurethral procedure. My ambition has made longer strides toward realization than even I anticipated; for witness the fact that during the past year at the Ancker Hospital and in private practice, only four major prostatectomies have been performed, while all other cases of vesical neck obstruction have been dealt with by transurethral operation. From this experience it appears that over 90 per cent of all cases of bladder neck obstruction are amenable to transurethral operation and no longer require the turmoil, suffering, risk and long hospitalization of major prostatectomy. The mortality rate and immediate results have been definitely superior to those obtaining in the same material by major operation during the immediately preceding years.

The few cases I had operated upon at the time of describing my original instrument and method in 1927, demonstrated the feasibility of the principles involved. However, the procedure was then handicapped by certain technical difficulties that made it unsuitable for routine clinical use. The chief difficulty was that of an inadequate cutting current. The generators available at that time did not have sufficient capacity to activate in water medium the large surface area electrode of the instrument and made oil distention of the bladder necessary. It may be pointed out, however, that with my original instrument and method I made the first reported transurethral removals of the extensive portions of the gland required to relieve adequately large benign hypertrophy. It was shown that practically any desired extent of the obstructing prostate could be excised transurethrally by a cutting electrode projected far beyond the sheath lumen, thus departing entirely from the punch and punch principle. It was undertaken, by perfection of the method, to make benign prostatic hypertrophy regularly amenable to transurethral operation. This has been accomplished.

Prior to description of my original instrument and method, transurethral operations had been restricted to cases belonging to the group of bars and contractures and to hypertrophies of small degree. The procedures in use had been the original punch operation of Young and its various elaborations.

The most significant one of these elaborations of the punch was that of Stern in which a wire loop supplied by a high frequency cutting current was substituted for the cold cylindrical blade of the punch. Technical limitations interfered with success of Stern's very significant enterprise when first presented and he abandoned the instrument and method, for they were found incapable of extensive removals and inferior to the conventional punch for small removals.

Since description of the original Foley instrument and method, high frequency generators have been perfected that deliver a cutting current of sufficiently good quality and intensity to make the punch type resectoscope satisfactory for routine clinical use. As you know, these modifications and extensions of the punch operation, in the hands of most urologists, already have largely replaced major prostatectomy.

Immediately a cutting current capable of en-

*Presented at the Minnesota Academy of Medicine meeting, St. Paul, February 8, 1933.

ergizing the large surface area electrode of my instrument became available, it was undertaken to improve the design and construction of the instrument and perfect the technic so as to make the procedure suitable for routine clinical use. At the May meeting, I described the stage that this development had then reached. It is my purpose tonight to exhibit for your approval the further improvements of instrument design and construction that have been accomplished since then and to report my clinical experience to date with this and other methods of transurethral operation for bladder neck obstruction.

The following lantern slides will illustrate the original instrument and method and the later improvements of design, construction and operative technic. The slides illustrating the original instrument and method and the instrument exhibited last May are re-shown now for the benefit of those who were not at the May meeting and for the purpose of showing the sequence of events and developments leading to the present form of the instrument that I will exhibit tonight. This latest instrument, the perfection of vision possible with it, the smoothness of its mechanism and greatly improved construction are a great advance over its predecessors.

REVIEW OF CASES

Since February 9, 1932, seventy-two operations have been performed, sixty-eight original procedures and four repeat operations. In the same period only four major surgical enucleations have been done. In only two of these were there contra-indications to the transurethral operation —large size and extreme vascularity of the gland. One of them weighed 120 gms. The other two cases were well suited for cystoscopic prostatectomy and the major operation was done for reasons not related to our considerations. Thus it is seen that of seventy-two consecutive cases, 97 per cent were amenable to the procedure and in 95 per cent it was actually employed.

The sixty-eight patients operated upon include a much larger proportion of poor risks than occurs in the usual run of cases of major surgical prostatectomy. In the first place a number of patients had been refusing major operation for years and were correspondingly older and more impaired. Secondly there is included a number of patients who would have been refused major prostatectomy because of its prohibitive risk. Finally, the report covers only the period since adoption of transurethral operation as routine and does not include the punch operations done in the specially selected cases of bar and contracture previous to this period. As is well known, the patients of this latter group are of much younger average age, have less severe grades of obstruction and are superior surgical risks. Accordingly this report does not include a disproportionate number of these specially selected cases and the results reported were obtained in a general run of vesical neck obstruction cases without special selection.

The distribution of cases on the basis of pathologic classification was, benign 79 per cent; malignant 16 per cent; undetermined 5 per cent. Among the cases classified as benign there was only the usual percentage of cases belonging to the group of bars and contractures.

There were thirty-three clinic patients and thirty-five private patients. The average age of the sixty-eight patients was 65.2 years. The youngest was 33, the oldest 82. Two-thirds of the patients were over sixty-five years of age. The following tabulation shows the age distribution by decades.

AGE DISTRIBUTION BY DECADES

Decades	Number of Cases
Third	1
Fourth	2
Fifth	14
Sixth	25
Seventh	24
Eighth	2
Total	68

A severe grade of bladder neck obstruction may exist without an appreciable amount of residual urine. In such cases the lesion asserts itself only by urinary symptoms in the form of hesitancy, diminished stream, frequency and dysuria. There are many such cases in which operation is indicated. However, the most obvious single indication is residual urine. Its amount in a general way measures the urgency of need for operation. From the standpoint of this indication the sixty-eight cases are analyzed in the following tabulation.

From this tabulation it is seen that in almost half the cases there was complete retention of urine. It may be doubted that any series of bladder neck obstruction cases operated upon would

present more definite indications for operation. In a general way there is a relationship between

DEGREE OF URINARY RETENTION BEFORE OPERATION

Amount of Residual Urine	Number of Cases
Less than 50 c.c.	7
50 c.c. or more	8
100 c.c. or more	12
200 c.c. or more	5
300 c.c. or more	5
Complete retention	31
Total	68

the amount of residual urine and the duration of the disease. The degree of general physical impairment and surgical risk is roughly in proportion to them and to age. The facts presented in the above tabulations, together with others already alluded to, are in support of what was said concerning the percentage of poor risks.

Among the seventy-two operations there were five post-operative deaths, an operative mortality of six per cent. Four of the deaths occurred among the thirty-three clinic patients; one death among the thirty-five private patients. This striking difference in mortality rate between the clinic and private patients is similar to that which existed with major operation in the same groups of material during the immediately preceding years. With the major operation we had a mortality of 18 per cent among clinic patients and 2 per cent among private patients. It is evident therefore that the post-operative mortality rate among the combined clinic and private patients has been considerably smaller with the new procedure.

It is wished to present the essential facts in regard to the cases of post-operative death. The comments concerning them should be taken as statements of interesting and instructive clinical facts, not alibis, for the patients were operated upon and died and there is no alibi for that.

CASES OF POST-OPERATIVE DEATH

Case 1.—Age, seventy-eight. Benign prostatic enlargement. Complete retention of urine. Advanced senile changes. Congenital infantile left kidney; hydronephrotic right kidney. Nitrogen retention. Depressed phthalein excretion. Advanced emphysema. Chronic bronchitis. Dyspnea. One hundred forty-three days pre-operative treatment. Major operation denied. After observing the post-operative course of several of his cronies on the ward the patient insisted upon transurethral operation in spite of its risk. Only 1.2 gms. tissue removed. Died sixth day after operation from spontaneous pneumothorax due to ruptured emphysematous bleb. Findings verified by autopsy.

Case 2.—Age, seventy. Carcinoma of prostate. Residual urine 250 c.c. General condition satisfactory. Possible metastases in lumbar vertebræ. No nitrogen retention. Satisfactory phthalein excretion. Appraised as good risk. Died fourth day after operation. Bronchial pneumonia. Autopsy permission denied.

Case 3.—Age, seventy-five. Advanced carcinoma of prostate with extension to bladder floor and peri-vesical structures. Advanced senile changes. Very poor general condition. Bilateral hydroureter and hydronephrosis with regurgitation on both sides shown in cystogram. Demonstrable metastases to vertebræ. Nitrogen retention. Markedly depressed phthalein excretion. Operation at first denied. Improved somewhat following long period of catheter drainage and operation was undertaken. Appraised as very poor risk. Over-distention of bladder with irrigating solution during operation. Smooth course for eighteen hours, then chill and temperature to 105 with rapid failure and death. Autopsy verified findings. Kidneys wet with watery purulent exudate. Bacteria demonstrated in stained sections. Cause of death: acute pyelonephritis, probably with general sepsis. (Ureteral regurgitation? tubular back flow? pyelo-venous back flow? resulting from over-distention of bladder during operation.)

Case 4.—Age, sixty-three. Benign prostatic enlargement. Residual urine 350 c.c. Good general condition. No nitrogen retention. Good phthalein excretion. Bleeding noted one hour following operation. A prolonged attempt to control the bleeding by fulguration through an ordinary cystoscope was made by an assistant. Condition poor when seen and the risk of failure and further delay in attempting to stop the bleeding by the proper method of fulguration through a straight tube urethroscope (panendoscope) did not seem warranted. A hemostatic bag catheter was introduced by suprapubic puncture and a cystostomy tube was put in place. Three transfusions were unavailing. Death occurred the day following operation. Autopsy verified findings. Cause of death: post-operative hemorrhage, improperly controlled.

Case 5.—Age, sixty-nine. Benign prostatic enlargement. Complete retention of urine. Low blood pressure. Tachycardia. Left ventricular preponderance. No nitrogen retention. Good phthalein excretion. Filiform stricture of urethra which could not be passed and required suprapubic cystostomy for drainage followed by prolonged course of urethral dilatations prior to operation. Appraised as fair risk. Death, which occurred seven hours after operation, was thought due to coronary occlusion. Autopsy denied.

From these brief summaries it is evident that two of the post-operative deaths (the third and fourth) were the direct result of technical faults and were avoidable.

The danger of over-distention of the bladder during operation has not been properly empha-

sized in the present limited literature of this subject. I believe that most of the mortalities reported as due to multiple abscesses of the kidney thought due to septic emboli from the site of resection are actually attributable to this occurrence. Many of these patients have dilated ureters with incompetent uretero-vesical valves. In the presence of complete bladder anesthesia inadvertent over-distention may occur. Ureteral regurgitation, tubular back flow and pyelovenous back flow should be expected from such overdistention of the bladder. Renal injury occurring by this means affords adequate explanation for the fact that the "septic emboli" in these cases have been confined to the kidneys.

Immediate post-operative bleeding as in the fourth case of post-operative death presents no great problem when dealt with by proper methods of control. The ordinary cystoscope with right angle telescope as used at first in this emergency is entirely inadequate. On the other hand the straight open end tubular sheath of a urethroscope or "panendoscope" with its concentrated brisk stream of irrigating fluid permits immediate identification of the bleeding point and control of it by fulguration or electro-coagulation. That this means of dealing with the situation was not immediately available, no doubt determined the outcome in this case.

In the first case of post-operative death it was distinctly bad judgment not to have persisted in denying operation in spite of the patient's wish to accept the risk of it. The risk in such cases should be regarded as prohibitive and operation should not be undertaken.

The second and fifth cases of post-operative death exemplify *inevitable* risks of any surgical procedure and warrant no comment beyond the summary reports already given.

Checkup residual urine determinations have been obtained in all cases, most of them at considerable intervals after operation. In a small number of cases we have only the residual urine determination at the time of discharge from the hospital. An analysis of the cases in regard to bladder emptying after operation is set out in the following tabulation.

In a group of cases presenting such a high degree of preoperative retention it may be doubted that major prostatectomy, in any hands, would yield results superior to these.

DEGREE OF URINARY RETENTION AFTER OPERATION

Amount of Residual Urine	Number of Cases
None	48
Less than 50 c.c.	7
Less than 100 c.c.	4
Patients with cystostomy tubes and cases of recent or unfinished treatment	4
Surviving patients	63

The results up to the last available information have been classified on the basis of bladder emptying, force of stream, and relief of symptoms according to the following tabulation.

RESULTS ON BASIS OF EMPTYING, FORCE OF STREAM, RELIEF OF SYMPTOMS

Result	Number of Cases
Well	44
Improved	14
Unimproved	1
Incomplete	4
Dead	5
Total	68

In a small number of cases "follow up" information as yet has not been obtained. Such cases are tabulated in accordance with the result as it was at the time of discharge. It may be that among these there are a few cases of unknown unsatisfactory results. However, experience has shown that almost regularly the condition at the time of discharge subsequently improves.

The following details are cited to illustrate the basis of classification. The one case classified as unimproved is a man thirty-three years old who had a contracture of the neck of the bladder and calcified prostate with a residual urine of only 40 c.c. Though his insignificant residual has disappeared his severe dysuria and frequency are as bad as ever. Another individual with greatly enlarged gland, a very large diverticulum and complete retention of urine had had a cystostomy made elsewhere at the time he presented himself. One month following operation there was still a residual urine of 100 c.c., probably attributable to the diverticulum. The suprapubic sinus had closed but according to a recent report it has reopened and is now draining. This individual is classified as improved. A man eighty years old who had a suprapubic prostatectomy sixteen years ago, had recurrent obstruction for which a cystostomy had been done elsewhere. He had been on suprapubic drainage for a year at the time he presented himself. A very extensive tissue removal was done leaving a widely open

prostatic urethra and vesical neck. The suprapubic sinus refused to close and it was discovered that there was a complete obliteration of the bulbous urethra. This I believe is another result of technical fault. If a stream of irrigating fluid is not kept flowing through the sheath during travel of the cutting loop, steam accumulates within the sheath with generation of a high temperature and possible injury to the urethra by this means. Thus far the patient has refused to permit correction of this obstruction in the bulb, which should be very easy to accomplish. This case has been classified as incomplete.

Something should be said concerning the four repeat operations. Two of these were very recent cases. In the first one there was a very extensive benign enlargement and complete retention of urine. When first seen, several months ago, the patient's general physical condition was very poor, the phthalein excretion almost zero and there was marked nitrogen retention. The patient barely survived the insertion of a cystostomy tube for drainage. During the succeeding six months there was sufficient improvement to permit undertaking the transurethral operation. The spinal anesthesia was a complete failure. Two small sections of tissue were removed but occasioned so much pain the procedure was discontinued at once. Ten days later under satisfactory anesthesia an adequate tissue removal was made. The cystostomy tube has been left in place for drainage until healing of the resected vesical neck and urethra is complete. When irrigating fluid is introduced through the cystostomy tube, all of it is passed per urethram by good stream. An eventually satisfactory result seems assured. In the tabulation of results this case is included among the four incomplete cases.

In the second case of repeat operation there was a very large gland, markedly diminished stream but a residual urine of only 75 c.c. At the first operation the anesthesia failed and the procedure had to be discontinued before a sufficiently extensive tissue removal had been made. Following this there was complete emptying but the stream remained small and cysto-urethroscopy showed an undesirable amount of remaining prostatic tissue. At the repeat operation a few days ago more tissue was removed than at the first operation and left a widely open vesical neck and prostatic urethra. An eventually satisfactory result seems assured. In the tabulation of results this case also is included among the four incomplete cases.

These two cases make evident an advantage of transurethral operation that is seldom mentioned. In these frail old men general anesthesia is very undesirable. Transurethral operation may be discontinued at any time should it be required by the patient's condition or failure of the spinal anesthesia. With the major operation there is no such choice, for the procedure must be completed at once.

The two other cases of repeat operation were both brought to successful conclusion. In one there was a large gland with complete retention of urine. The anesthesia was perfectly satisfactory and at conclusion of the first operation an adequate tissue removal appeared to have been accomplished. This was not the case. Thirty days after operation the stream was still small and there was a large residual urine. A second operation was then made and an additional 10 gms. of tissue removed. At the time of the last follow-up report, almost three months following operation, there was complete relief of symptoms and no residual urine.

The fourth case of repeat operation was a case of my own impatience. This patient had a hypertrophic median bar and complete retention of urine. Only a small tissue removal was required. Twelve days after the first operation there was still a large residual urine. At this time cysto-urethroscopic examination under spinal anesthesia showed what appeared to be a satisfactorily open vesical neck and prostatic urethra. However, with the opportunity at hand two small additional sections of gland were removed and the procedure must be recorded as a repeat operation. At the time of discharge the residual had diminished to 75 c.c.; a month later it was only 15 c.c. and there was complete relief of symptoms. It may be doubted that the second tissue removal was actually required for it is well known that diminished stream and residual urine may persist for some time following operation, apparently due to postoperative swelling or some other cause of bladder dysfunction. In appraising what has been accomplished by operation, little importance should be attached to the persisting urinary symptoms or residual urine until at least a month has elapsed following the procedure.

During this period of instrument designing and

building, continuous altering and repairing of instruments has made it impossible to have always at hand one of the new type instruments to work with, for, though zealous, I have not deliberately imposed on any patient an instrument known to be unsatisfactory. Accordingly in about two-thirds of the cases some form of punch instrument was used, while my own method was employed in about one-third. Among all of these latter cases the results have been excellent and there have been no postoperative deaths.

Any of the procedures for transurethral removal of extensive portions of the gland that have been advocated the past year or two makes demands on the abilities of the skilled and experienced transurethral operator. In such hands they carry no unusual hazard and, when properly executed, excellent results are regularly obtained. Similar comment applies particularly to the Foley Excisor and method of cystoscopic prostatectomy. It may be said, however, that they require technical skill, competence in lens vision and knowledge of bladder neck anatomy that may not be met by some operators able, perhaps, to use an instrument of punch type. This makes a fair criticism of the individual, not the method. What may be said of the punch instruments also applies here: when properly executed, excellent results are regularly obtained.

For all of these procedures adverse criticism from incompetent experience may be looked for but to the fair judge it can mean nothing. The large experience already had is ample proof that in competent hands these methods are eminently successful in relieving obstruction and the symptoms caused by it—at least thus far. The eventual and permanent appraisal of "The New Surgery of Bladder Neck Obstruction" can only be concerned with results in such hands and with the evidence to come as to whether or not the results obtained are permanent.

The latter question as to eventual end-results has loomed large in the minds of some very competent urologists. A few of those in this minority, while raising doubt as to permanence of results by transurethral operation, also express themselves as well satisfied with major prostatectomy, the hardships and economic loss of which are lightly passed over. This happy view is not shared by all urologic surgeons of ability nor by many patients. Certain critics belonging to this group must not be aware of their failures with prostate removal by major operation. Personal clinical contact with some of their cases of poor results has contributed somewhat to an inability to share their happy view of the open operation. Any surgeon of experience knows that major prostatectomy imposes suffering, anxiety, large risk to life, long convalescence, economic loss and financial hardship. By token of such blind opinion are these things to be ignored, is major prostatectomy to be accepted as perfection, is it to brook no criticism and be the end of progress? For adverse criticism of The New Surgery of Bladder Neck Obstruction proceeding from such prejudice there can be no quarter.

The forward looking urologist and fair, though conservative judge who withholds judgment pending the proof of time as to eventual end-results belongs to a different class from the critics mentioned above. It can only be said that he is over-conservative. Thus far no clinical evidence in the way of the feared recurrent obstruction has been brought forward. The only reasonable conclusion to date is that "The New Surgery of Bladder Neck Obstruction" is a vast improvement and should supplant major prostatectomy in all except the small number of cases in which the procedure is not technically feasible. If prejudice and "feeling" are left out of consideration, this appears to be the only definite contraindication.

The most recent and improved forms of the Foley Prostate Excisor and accessory instruments and apparatus were exhibited.

DISCUSSION

Dr. W. F. Braasch (Rochester): Dr. Foley certainly has a genius for developing instruments of this kind. The instrument shown this evening is most ingenious and practical. I must say that it is with some hesitancy that I show the comparatively simple instrument known as the Bräasch-Bumpus resectoscope, which we are using at Rochester. Our prostatic resections have been done largely by my colleagues, Dr. Bumpus and Dr. Thompson, and much of the technic now employed was developed by the former. There is no question whatever but what transurethral resection is here to stay. The fact that it is appreciated is shown by the way patients themselves know of this operation and ask to have it done. It is also of interest that there is no time when we do not have at least one physician in our hospitals who has had transurethral resection at his request.

The operation we employ is a modification of the punch operation of Young, with several important additions, such as visualization of the field, partial electrocoagulation of the tissues prior to cutting, and coagulation of the bleeding blood vessels after resection. The technic which we employ is comparatively simple but its success is founded on a thorough familiarity with the anatomy involved. It is of greatest importance to keep within the safety zone which, as Dr. Thompson has emphasized, is bounded by the verumontanum on one side and the intra-urethral ridge on the other.

Dr. Foley is right when he says it is not the size of the gland so much as it is its situation with reference

to the bladder neck which is of importance. Formerly it was thought necessary to remove the entire prostate gland in order to overcome urinary obstruction, but Dr. Caulk of St. Louis demonstrated that removal of the obstructing portion of the gland was followed by shrinkage of the remaining gland tissue with normal drainage of the bladder. How long before the remaining tissue will again cause obstruction remains to be seen, but from present evidence in most cases the relief is permanent, or there is at least relief over a period of several years.

Just how much tissue should be removed is another question. In some 600 cases done at the Clinic the average amount of tissue removed has been between 7 and 9 grams. There were many cases in which from 10 to 12 grams were removed and several as high as 40 grams. The essential factor is to secure a wide opening at the bladder neck by the removal of all obstructing tissue in this area and extending a short distance into the bladder and prostatic urethra.

We see many patients who come to us with a history of only a moderate degree of difficulty on urinating. Many of these patients will have only a few c.c. of residual urine and others only 30 to 100 c.c. Instead of waiting until there is a large amount of residual urine these patients have either learned or they have been instructed by their physician to seek relief immediately. As a result we do not see nearly as many patients with distended bladders, renal insufficiency, and other complications as formerly. That may be one reason why we have had such good results in the last few years, although there were more patients resected whose physical condition was poor and who had various complications so that suprapubic or perineal prostatectomy would have been impossible. There were also many patients over seventy and eighty years of age.

From January 1, 1927, to January 1, 1933, a series of 499 prostatic resections was done at the Clinic, with seven deaths, or a mortality rate of 1.4 per cent. During the past year there were 285 patients resected, with no deaths.

In transurethral prostatic resection, therefore, we have a method at our command which has many advantages over the old methods of prostatectomy in relieving urinary obstruction. There are various methods of removing the obstructing portion of the gland. Although Dr. Foley's operation is a more thorough as well as radical procedure, whether it is necessary to remove the amount of prostatic tissue excised by the Foley method remains to be seen.

Dr. P. F. Donohue (St. Paul) (by invitation): The subject has been so completely covered by Dr. Foley and Dr. Braasch that there is very little left to say. I might add a few remarks to what have already been made concerning the rationale of the operation. Certain important clinical observations have been made concerning the behavior of the obstructing prostate when drainage of the bladder has been instituted. It was found that on rectal examination before drainage, the prostate was very much enlarged, swollen and spongy, and after bladder drainage the prostate was smaller in size and of firm consistency. Also cystoscopic examination before drainage showed marked intra-urethral and intra-vesical intrusion of median and lateral lobes and marked increase in the vascularity of the overlying mucosa. On cystoscopy following a period of bladder drainage the lateral and median lobes had receded and the increased vascularity of the mucosa had disappeared. These changes were most marked when the drainage of the bladder was by means of suprapubic cystostomy. In fact, occasionally the regressive changes were sufficiently marked to permit temporary ability to empty the bladder and spontaneous closure of the cystostomy opening.

Because of these observations the question was raised whether or not removal of only the obstructing portion of the prostate would be sufficient to permanently restore normal urination. Young and Caulk with their punch instruments had successfully relieved obstructions in cases of median bar and contracture of the bladder neck. Caulk became so enthusiastic with the possibilities of transurethral removal that he began using his cautery punch in cases of obstruction due to adenomatous hyperplasia. As Dr. Braasch has said, this work of Caulk was of great importance. He showed that removal of a small proportion of the total growth was followed by shrinking of the gland and relief of the obstruction. This work has stimulated the development of suitable instruments to accomplish adequate transurethral removal of even the larger obstructions.

As has also been mentioned here, the procedure demands a thorough knowledge of the pathology of bladder neck obstructions and accurate determination of the portion of tissue responsible for the obstruction. Cystoscopic examination of the vesical neck before operation and proper interpretation of the cystoscopic views will determine the portion of tissue to be removed.

Dr. C. D. Creevy (University of Minnesota) (by invitation): The shortness of my own experience makes me diffident about commenting upon the work of such experienced men as Drs. Braasch and Foley, who are really my preceptors. My second hand experience, however, has been especially valuable, since it has been my privilege to work under Dr. Bumpus at Rochester; to see Professor Lichtenberg of Berlin use an instrument much like that of McCarthy; and to observe Dr. Foley use both his own instrument and that of McCarthy. It is my impression that the method of choice is that which best suits the individual operator.

The outstanding advantages of the Foley method are the rapidity with which the excision can be done, and the smooth surface which is left afterwards. The only real problem is, as Dr. Foley has pointed out, the extraction of the excised tissue from the bladder.

My own experience covers approximately 120 operations upon 100 patients with a mortality of 3 per cent; the first hundred operations were done with the Braasch-Bumpus instrument, and the last twenty with my own modification of the Stern-McCarthy electrotome. While I have found the latter much easier to use, it does not follow that this would be true for everyone.

I should like to congratulate Dr. Foley on the excellent design and originality of his instrument, and upon its effectiveness.

Dr. C. B. Wright, Minneapolis: I would also like to pay tribute to the inventive genius of Dr. Foley as demonstrated here on numerous occasions. We physicians see a good many old men who have more or less difficulty with urination, not severe, but limiting their activities and their freedom to considerable extent. Many of these men have gone for many years getting no worse and some of them apparently improving, particularly when they have been careful about their water intake or cutting out much water drinking late in the afternoon and evening and avoiding large amounts of fluid at any one time. I have not advised cystoscopic examination unless there is evidence of increasing trouble or some abnormality of the urine. Even when there is a moderate amount of residual urine I dread suprapubic prostatectomy, unless there are very definite indications, because these men so frequently have chronically infected bladders afterwards even when they have not shown infection before. If this operation is without mortality and is as simple as reported by Dr. Foley and Dr. Braasch we will certainly have to revise our indication for prostatic operation, as many men in good health would be relieved of the fear of retention and the urgency of urination by operating at a much younger age, where one could be sure he was not advising operation in the presence of inflammatory conditions which might improve under other forms of treatment. There is no doubt we medical men will have to adjust ourselves to this more modern

and much more harmless operative therapy in many of the milder forms of prostatic hypertrophy.

Dr. F. E. B. Foley (in closing): Dr. Braasch mentioned a mortality rate that at once struck me as too unfavorable a comparison with ours. However, Dr. Braasch himself very nicely points out certain factors making for this difference. In the first place his cases extend back to 1927 when transurethral operations were restricted to cases of bar and contracture and long before the method had been extended to large glands. There is included therefore in his statistics a considerable number of ordinary punch operations done in the selected group of bar and contracture cases giving a much larger incidence of such cases than in our series. The individuals of this group are of much younger average age and the degree of retention is usually much less, so that they are superior surgical risks. Our cases included no punch operations done in the selected group of bar and contracture cases prior to adoption of transurethral methods as routine for all vesical neck obstructions except those in which it is technically impossible.

Also Dr. Braasch's chart showing the degree of retention brought out another significant difference. Almost half of our cases were in complete retention, the average amount of residual was considerably higher and the percentage of trifling residuals was smaller. These things have their bearing on operative risk and mortality. Finally the cases encountered in a hospital like the Ancker, which is an almshouse, are very inferior risks by comparison with those met in private practice: witness for example four of our deaths among these patients as against only one among a larger number of private patients. The indigent old man who has fought off operation for years and finally goes into complete retention doesn't get on a train; he comes to the Ancker Hospital. This question of mortality is always over-emphasized whenever the surgery of prostatism is discussed; obviously it is an entirely relative matter. The important thing is we are agreed that transurethral operation is a valuable contribution.

I like my instrument best and see certain advantages for it. It may be able to take out a large quantity of tissue quickly but this has no great significance. Dr. Braasch reports the removal of over 40 gms. by the Braasch-Bumpus method—and certainly that is enough. All we want is perfection and adequacy of the job done.

Dr. Creevy told you of seeing one of these operations and how rapid and extensive an excision of the gland was made. He graciously refrained from telling you that the anesthesia wore off before the large piece of tissue was removed from the bladder and that it had to be left there. It was removed a few days later. The patient completely empties and has a perfect result.

Dr. Wright brings up the question of indications for the operation. Exactly what they are I am unable to say; but certainly I don't subscribe to "Prophylactic Resection." There is a type of case in which the operation is generally considered indicated but I doubt that it is. I would like to know the views of Dr. Braasch, Dr. Creevy and Dr. Donohue in regard to such cases. I refer to so-called contracture of the vesical neck in which there is a cicatrization and contraction of the whole prostatic urethra. The only one of our cases classified as absolutely unimproved is just such a case.

Dr. W. F. Braasch (Rochester): Fortunately we have not seen very many of the described type; they certainly are most difficult to treat. I believe that a thorough excision of the obstructing scar tissue in the bladder neck and in the urethra as far back as the verumontanum will be followed by free bladder evacuation. These cases are not adapted to suprapubic or perineal operation.

THE ETIOLOGY OF COMMON ANAL PATHOLOGY AND FOCAL INFECTION*

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THE quest in medicine has always been directed towards the finding of the causative factors in disease. Because of their accessibility, lesions of the terminal rectum and anal canal offer an unusual opportunity for the study of etiology and methods of treatment. It is the more common lesions occurring in this region that I wish to discuss, and to point out what I feel is the sequence of events in their development.

A great deal of anal disease is centered about the anorectal junction. Pennington states that 85 per cent of diseases in proctology are located about this line (Fig. 1). There are several possible reasons for this, but the most important one is based on the structural findings resulting from embryonic fusion, plus subsequent infection. By the anorectal line or junction is meant the very definite line at the proximal end of the anal canal which marks the abrupt change from squamous to columnar epithelium, and which is the result of the fusion of the hind gut and the proctoderm during intrauterine life (Fig. 2). This anatomical landmark has been called the dentate line, the pectinate line and the White Line of Hilton. What name is given to it, however, is not so important as long as its significance is recognized. The anorectal line is definite, constant and easily identified, and, even when at all vague, can be located by fixed anal anatomy: the anal crypts, the anal papillæ, the Morgagnian columns and the difference in tissues on the two sides. This is evident at the proximal end of the anal canal as a distinct line or ridge, complete in circumference, seen with a short

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anoscope or even without instrumentation in certain individuals (Fig. 3).

When we consider that the anal canal is formed by the fusion of two tubes derived from and have their openings directed upward, against the fecal current, and are usually crowned with small anal papillæ. Thus they act as veritable "catch basins" for foreign material. There is a

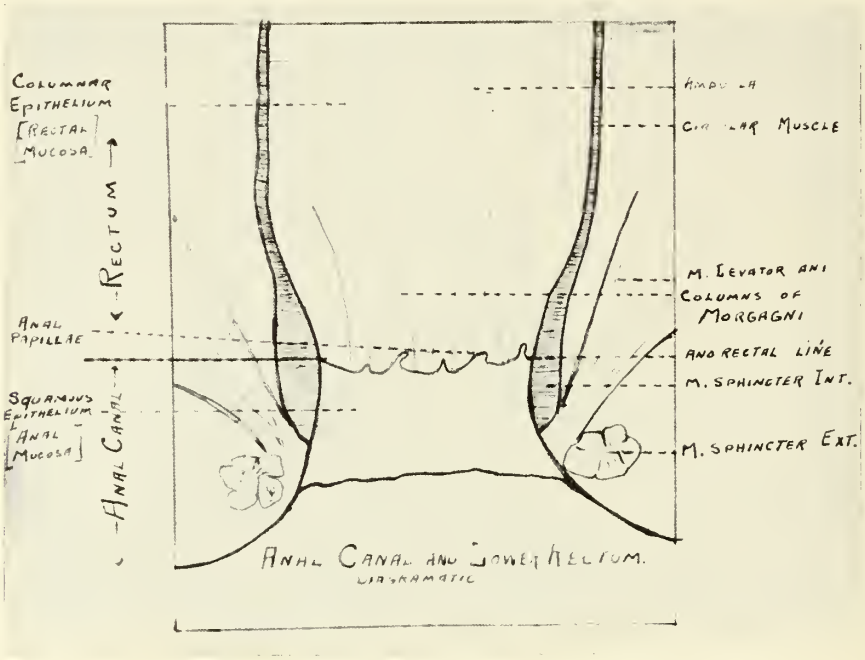


Fig. 1. Diagrammatic sketch of terminal rectum and anal canal.

different germ layers and of different calibers, is it not possible that this fusion may not always be complete in its circumference, and so structural defects may result? The hind gut is larger than the proctoderm, and in fusing with the proctoderm a great deal of puckering or folding of the hindgut is necessary. This fact alone would explain the columns of Morgagni as well as a variation in the depth of the anal pockets or crypts. I feel that an incomplete fusion or a "poor joint" often results in the fistulæ which occasionally occur in infants, during the first few weeks of life. Within the past year two infants less than five months old have been operated upon for anal fistulæ with definite crypt openings. We also know that the common type of imperforate anus is a persistent anal membrane, due to lack of absorption of this embryonic septum.

Aside from definite developmental defects, which can account for pathology in infants, many other conditions are due to the presence of the anal crypts alone, and their peculiar invitation to infection by virtue of their position and location. They vary from three to twelve in number variation in the normal depth of these crypts so that from purely mechanical reasons persons with deep crypts are more prone to develop anal disease. The presence of the crypts, regardless of their depth, is a factor of importance. It is comparatively easy to examine the crypts with a hooked or bent probe. Local imflammation is often present, although no foreign material can be found at the time of examination and doubtless many crypts become infected without the irritation of a foreign body. I do not think that enough attention is given to the anal crypts or to the infections occurring in them, either from the standpoint of local disease or focal infection. Most of the more common anal lesions are associated directly or in part with these crypts, namely: cryptitis, anal fissure, anal fistulæ, hemorrhoids, pruritus ani, foreign bodies, stricture and a large group of focal infections. Many patients complaining of burning on defecation, dull pain following the act, slight bleeding and irritation, will be found on digital examination to have spastic and tender sphincters, and on anoscopy, to have definitely inflamed and reddened crypts (a cryptitis). The establishing of adequate

drainage of these by simple cryptotomy will usually result in cure. Patients may have the same complaints due, not to a cryptitis, but to an irritated mucosa of the terminal rectum.

and the circular muscle, to form an internal or submucous abscess which ruptures leaving a complete submucous sinus. In case sufficient drainage takes place at the point of entry, a blind

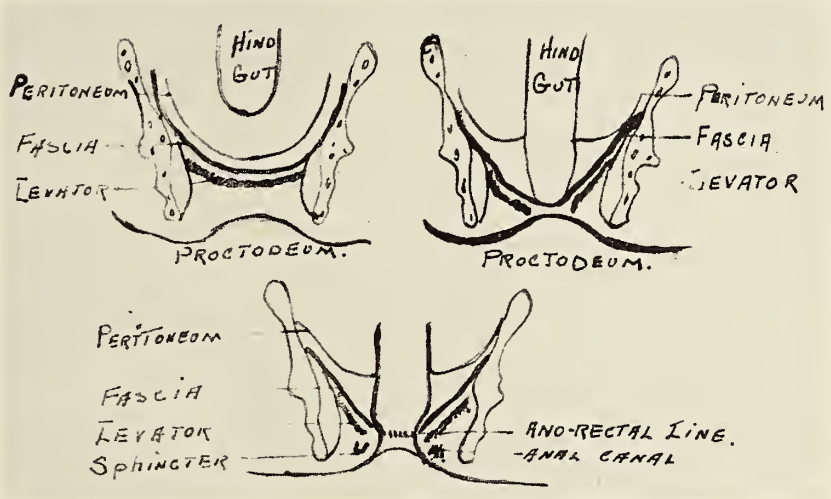


Fig. 2. Sketch showing formation of anal canal.

The common lesion of anal fissure very often has its origin in one of the anal crypts, most commonly the one lying directly posterior. An infection in the crypt, breaking through the floor of the crypt, forms a small submucous sinus, outside the external sphincter. Following trauma, by a scybalous or irritating stool, a foreign body or instrumentation, this sinus ruptures and forms a linear tear or a fissure (Fig. 4).

This type of fissure is to be differentiated from the anal crack which becomes chronic and deepened and also results in the formation of a sentinel pile and has no relation to the crypts and is wholly initiated by trauma.

The common type of anal fistulæ or sinuses have somewhat the same sequence. The infection in this case breaks through the bottom of the crypt, in any quadrant. The rupture may be completely through the bowel wall or between the mucosa and the muscle, or the circular and longitudinal muscles. An abscess is formed which finds its way to the surface in one way or another: superficial to the external sphincter, forming a submucous sinus; through the sphincter; between its deep and superficial fibers; between the external and internal muscles, all paths being distal to the crypt in question. The other common type, rather than extending downward, runs upward between the rectal mucosa internal submucous sinus or fistula results. It is very common to find these blind sinuses running up from the crypt and they are a very potent source of focal infection. The radical cure of all of these sinuses rests upon the eradication of the internal and crypt opening. Their etiology, however, is dependent upon the infected crypt.

Among the many contributing causes of hemorrhoids is infection in the tissues about the terminal rectum and anal canal and through these tissues the hemorrhoidal veins. This infectious process, admitted through the anal crypts, causes phlebitis with weakening and dilatation. Malmgren, in Buie's Treatise, states that, "Hemorrhoidal disease, microscopically, is essentially a degenerative disease of the veins," so we again must come back to the crypts as portals of entry for infection.

Pruritus ani, the ever baffling symptom, should also be discussed to some extent as there are certain types of cases that are definitely benefited by cryptotomy, and so on empirical grounds these crypts must be the predisposing etiological factor. This applies to those cases of pruritus where there are no definitely known contributing causes, such as fissure, fistula, prolapsing internal hemorrhoids, anal hemorrhoids, causing leakage and maceration, parasites or eczematoid derma-

titis. In these cases in question the terminal rectum and anal canal is reddened and edematous, as are the crypts. In this type of case, we do know that certain of them are benefited by cut-



Fig. 3. Low power, showing abrupt change from columnar to squamous epithelium at the anorectal line.

ting down all the crypts and establishing drainage. If this procedure does not accomplish the desired result, other methods must be applied. Pruritus ani is a most stubborn condition, and if cryptotomy will give relief in even a small percentage of cases, it may well be added to the numerous and accepted methods of treatment. An English author, Abel, has reported relief from pruritus ani following, what he terms, pectinotomy, or the incision of a fibrous band which has formed in the anal canal in the area between the anorectal line and the beginning of the true skin, or what he chooses to call Hilton's Line. This operation is akin to cryptotomy, and possibly in doing it the crypts are sufficiently opened to establish drainage. Conversely, doing a cryptotomy may accomplish the same results as pectinotomy. Foreign bodies, when present, most commonly are found caught in the crypts. Spicules of beef or chicken bones, the scaly covering about apple seeds, apple seeds and small berry seeds are the most frequent findings. These often cause sufficient trauma to perforate the bowel wall with resulting abscess and fistula. The crypts however are the offenders. If the foreign body can be removed, and no damage has been done to the lining, all is well, but if infection has been introduced into the surrounding tissues by puncture a more radical procedure will be necessary. McKenny reports a long list of foreign bodies that he has removed from lesions in the lower rectum and anal canal, and finds them most commonly in the crypts. This, also, has been our experience.

McKenny states that most rectal strictures are due to extension into the submucosa of infection of anorectal origin. It has been taught that most benign strictures were leutic in origin but at the

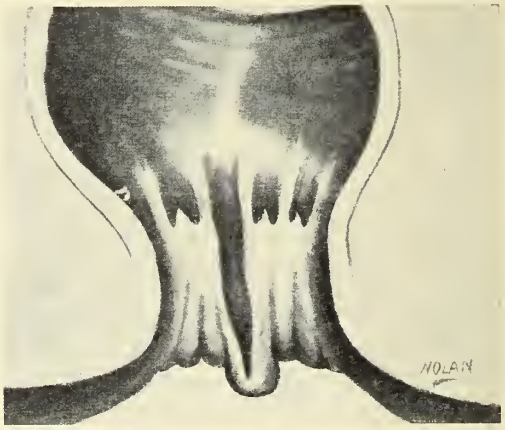


Fig. 4. Formation of fissure by tearing down of crypt. (From Hirschman, Text p. 188.

present time we feel this is not the case. Barring postoperative and traumatic strictures, the majority are undoubtedly due to inflammatory changes, which may have originated in the crypts. Hayes reports gonorrhea as being the most common infectious agent in the colored race. With these facts in mind, it is necessary that we alter somewhat our views as to the portal of infection of strictures in the anal canal and terminal rectum and again accuse the anal crypts.

Focal infection of anal origin has been definitely established by many investigators, as a common finding. No less an authority than Hirschman states that "anal cryptitis is probably the most frequently overlooked source of focal infection that is present in the human body." So while in our examinations we are searching for foci of infection and investigating the tonsils, teeth, sinuses, appendix and prostate, we must not overlook the rectum and anal crypts. I feel that most so-called rectal infections are primarily crypt infections. While these are responsible for many foci, it is very often the small sinuses running from them that are overlooked. These may run upward, downward or laterally, most frequently downward and laterally. In order to properly examine the crypts for hidden sinuses it is necessary to use a bent probe or hook, with the anus dilated, preferably with a bivalve speculum. The probe must be blunt and be used with extreme care as the tissues are very friable.

It is sometimes possible to sufficiently evert the anal canal and make the examination without a speculum.

Focal infection of crypt origin is definite and no examination for foci should be considered complete until they have been searched.

A word relative to cryptotomy. This may be done under local anesthesia, is not a serious procedure and causes little postoperative discomfort. No organ is removed and no damage of permanent nature is done, which cannot be said of other focal points.

CONCLUSIONS

1. Much of the common anal pathology originates in the crypts of Morgagni and they are the focal points of many hidden infections, which cause remote disorders.

2. Developmental defects of fusion at the anorectal line often account for local disease in infants.

3. The anorectal line or junction, the junction of the squamous and columnar epithelium, is an important landmark from the standpoint of etiology and topography, and should be identified in examination and treatment.

4. Cryptotomy is indicated for treatment and may be done in the interests of prevention. It is a harmless procedure causing little disability.

5. A comprehensive anorectal examination is indicated when complaints point to local disease or when focal infection is suspected.

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MODERN METHODS FOR CARING FOR THE DEAF AND HARD OF HEARING*

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NOTABLE advances in the methods of caring for the deaf and hard of hearing have been achieved during the past decade. They have come about so unobtrusively that their significance in the large field of deafness prevention and amelioration is known only to a relatively small number of otologists, educators and social workers. Since they are of great importance in the lives of several million deafened persons in the United States alone, a wider appreciation of the newer possibilities in dealing with the problem of this large handicapped group is desirable.

The physician is the person most frequently consulted in implicit confidence by the individual concerning his own hearing or that of some member of his family. Not infrequently, for want of up-to-date technical knowledge, the medical man gives very questionable advice, sometimes with unfortunate results.

Our care of the deaf in the past has been based largely on theory and unfounded tradition. There have been and still are many gaps in our fundamental knowledge of the causes of deafness and the best methods of its prevention and treatment. Recent additions to our knowledge in these lines are encouraging and demand a revision of many of our old ideas.

Several inter-related factors have contributed to our progress. They include the following:

1. The development of the audiometer has established new standards for detecting and accurately measuring hearing loss. This has made possible extensive research in the problems of deafness.

2. The audiometer has confirmed the fact that a majority of children heretofore pronounced deaf and declared to have no hearing, because they could not hear articulate speech, still possess variable remnants of hearing acuity, which, by means of newly perfected appliances, can be successfully utilized in teaching them correct speech and in their general education.

3. The audiometer has also made possible the more accurate study and treatment of deafness among adults and has yielded convincing proof of the value of conserving residual hearing.

4. Appreciation of the importance of residual hearing has greatly stimulated the improvement of electrical hearing aids, resulting in greater efficiency and a far wider range of application.

5. The value of the art of lip reading, or

*Read before the Southern Minnesota Medical Association, Rochester, Minnesota, September 12, 1932.

speech reading, has only in recent years received just recognition. Not until 1926 did the National Education Association officially establish its department of lip-reading.

6. The growing realization that the ultimate causes of deafness in many cases are not localized in the ears but are to be found in pathology in other parts of the body has opened new possibilities of prevention and treatment.

The successful care of the very young child with a congenital or early acquired deafness (once called "deaf and dumb") involves first the early discovery of his defect, and second, the prompt provision for the highly specialized education which his handicap demands. Severe deafness in the young infant may be assumed when he does not respond to the cochleo-palpebral test and fails to acquire normal speech at the age when children ordinarily begin to talk.

His special education should begin at the earliest possible age. It must first come, in the majority of cases, from his parents, chiefly the mother. It is well to know that correspondence courses for the parents of deaf children, conducted by accredited educators of the deaf, have lately been made available. The best results are attained only by the personal efforts of a specially trained teacher.

Unfortunately, our State School for the Deaf admits pupils only after the sixth year, which means for many children a loss of time and mental development which can never be made up. Day schools for the deaf may be organized in Minnesota with generous state aid for a minimum of six pupils. Such schools admit children at the more favorable age of four years. Practically all larger cities now maintain special public day schools for the deaf.

The needs of the young deaf child for whom a special day school is not available are best met by the private school. A frequent obstacle in the education of such a child is the mistaken, sentimental reluctance of parents to allow their deaf child to be separated from them. This can often be overcome by having them visit a well conducted school for the deaf where they are convinced of the superior advantages of the special school. On the other hand the complete segregation of a partially deafened child with totally deaf children is an educational crime. His best development demands contact with normal children.

A notable advance in the work in up-to-date schools for the deaf is found in the remarkable results lately attained through the use of the special electric hearing aids providing high degrees of radio amplification of the voice with a minimum of distortion. By this means many pupils with some residual hearing, who can not be reached at all by the conversation voice, now receive training through the ear. Vastly better results are thus secured in the teaching of speech. It is now possible to conduct much of the work in groups. Enthusiastic interest is thereby stimulated among the children and their educational progress is greatly accelerated. At the same time the teacher's heavy burden is materially lightened.

The preschool child with moderate hearing loss presents a difficult problem, for he is most frequently overlooked. His discovery calls for close coöperation of the otologist, the pediatrician and the general practitioner with the social worker. In time the problem will undoubtedly be met by our public school authorities and public health workers.

The most satisfactory results in deafness prevention and the conservation of hearing are being obtained today among children of school age. By means of the audiometer used in making periodic hearing tests, a significant hearing loss, often overlooked by ordinary methods is readily detected. Many cases thus discovered in their early stages are cured through the ensuing medical follow-up and the prompt removal of the active causes. The causal conditions at this age include pathological tonsils and adenoids, interference with normal nasal breathing, recurrent or chronic sinus infections, inflammatory conditions in the Eustachian tube, middle ear and mastoid and constitutional disturbances making the child susceptible to upper respiratory infections. The treatment is obvious.

Between 4 and 6 per cent of all school children in the United States are found to have a significant hearing loss. These tests reveal, among other things, first, that moderate degrees of hearing loss even in one ear are responsible for much retardation in class work. The repeating of classes, a costly process for the taxpayer, is three times as frequent among hard of hearing children as among others of the same age group. A second fact is that the incidence of hearing impairment occurs twice as often among children in

rural communities as among children in large cities having a school health program which not only provides for the educational needs of the deaf and hard of hearing child but also insists that he receive the proper otological care. Hearing loss recently has been found to be nine times as prevalent among stutterers and those with other speech defects as among the general student population where the subject was investigated.

The work of conserving the hearing of school children is as yet in the early stage. More than one hundred cities have already adopted the periodic audiometric testing of their school children. The idea is rapidly spreading. Only when it is universally applied through the activities of local and state school authorities can its full possibilities of accomplishment be attained.

The hard of hearing adult, even in these days of widespread medical knowledge, is far too often the victim of ignorance, indifference, neglect and inadequate professional advice. The reasons are many. Few people realize that one may sustain a very considerable hearing loss without being aware of it. Many cases of handicapping deafness are marked by a gradual, unobtrusive onset and progress insidiously. When the victim first notices his loss the damage sustained has been considerable and is often irreparable. Neglect is also due to the widespread fallacy, nearly as prevalent among the medical profession as among the laity, that little or nothing can be done to remedy chronic ear diseases. The result is thoughtless or deliberate failure to seek timely medical aid.

Modern otologic opinion teaches that many cases of hearing impairment with a gradual onset and slowly increasing severity are not of the hopeless, progressive type. Many can be prevented or arrested by early discovery and the prompt removal of the causes. This at once suggests that the prevention of deafness on any comprehensive scale must begin with the periodic testing of the hearing at all ages by the best means available. The use of the audiometer for this purpose has been endorsed by all of our national and many local organizations of otologists. It often reveals definite hearing loss in the higher ranges above those of the conversation voice, which are not noted by the patient or disclosed by casual tests. The discovery of any significant loss demands a careful oto-rhinological examination to which must often be added a far reaching general medical and dental examination.

The possible causes to be looked for in adults include not only local inflammatory disease of the hearing organ itself, but obscure pathological tonsils and hidden, infected tonsil stumps, adenoids, nasopharyngeal scars and adhesions, interference with normal nasal breathing resulting in defective tubal ventilation and drainage, chronic nasal sinus disease, pyorrhea and apical dental abscesses, infections of the gall bladder, prostate and other remote organs, dysfunction of the endocrine glands, intestinal stasis, nutritional and constitutional disease, including neurosyphilis, and many others, all frequently overlooked as possible factors in producing deterioration of the organ of hearing. It is evading the issue and betraying one's ignorance or lack of interest when we attempt to console a patient by saying his deafness is caused by old age.

The physician who with cruel bluntness tells the hard of hearing patient who consults him in his first attempt to get aid that nothing can be done to improve or alleviate his condition is unfair to the patient and discredits the medical profession unless such opinion is based on the results of a careful examination.

In many of these cases experience proves the condition can be improved by removal of the causes. In others the progress of the hearing loss can be arrested or retarded. In still other cases, but in diminishing numbers, the hearing loss will increase in spite of all efforts. Whatever amount of residual hearing can be salvaged for any patient is to him a most valuable asset. Even if his hearing power diminishes in spite of all that may have been done, kindly consideration demands of the medical man that he encourage his patient to use every legitimate means to retain whatever remnant of residual hearing he may possess and not allow him to become the prey of quackery. The physician will also help the deafened patient to find the best means of adapting himself to his unfortunate condition.

Local organizations of the hard of hearing, to be found in more than a hundred American cities, are of great service in the intellectual, social and economic rehabilitation of the deafened adult. The national organization for the hard of hearing also serves many isolated persons in their homes.

With the use of modern electric hearing aids

it is possible for one who has sustained a very considerable hearing loss to still keep his contacts with the world. It is often difficult to induce a patient to resort to such a device because of a false pride or fear of disclosing his disability. He should be encouraged to begin to use one early in order to gradually become accustomed to the amplified sounds of the instrument. If he delays too long it is very difficult for him to accustom himself to the sounds of amplified speech which come through with all other adventitious sounds equally amplified. The result is confusion and discouragement. He must begin with patience to learn again to interpret the sounds of speech and differentiate them as he would were he learning a new language in a noisy place.

Thus it is a great mistake to permit a person with failing hearing to delay the use of a hearing aid as long as possible. Yet such advice is often given by those inexperienced in these matters.

Great improvements have been made in the construction and servicing of these aids. The later models are light, compact and unobtrusive. The possible degree of amplification has been greatly increased and the amount of distortion reduced to a minimum so that many persons who could not use them because of distortion and noises can be satisfactorily equipped. An audiogram is of great help in determining the type of hearing aid best suited to the individual. A person should be advised that no instrument should be purchased outright until it has been tried out in comparison with other models of various makes, for there are variations in the quality of the output so that only the user can determine what will best suit his individual requirements. The ultimate test of the serviceability of an electric hearing device is that of intelligibility for connected speech. A physician familiar with the subject can be of great assistance to his patient in selecting a suitable hearing aid.

The greatest aid to the hard of hearing individual is found in lip reading or speech reading. Contrary to the mistaken advice often given by the thoughtless to postpone taking up the study of this art as long as he can get along without it, the person who discovers that he has an annoying hearing loss which is permanent should promptly begin the study of lip reading under the best possible guidance. With intelligence, good eyesight and persistent effort the skill which may be acquired in lipreading is astounding. In many cities free lipreading classes for adults are provided by the public schools.

The average hard of hearing person who has become a skilful speech reader, equipped with a good electric hearing aid and who has regained his morale, is well able to maintain his place in the world through the same contacts and activities which make life worth while for the normal hearing person.

CONCLUSIONS

1. The education of the severely deaf child who would not normally acquire speech is a highly specialized work and should begin at the earliest possible age under the guidance of specialists in this field.

2. The prevention of deafness on any comprehensive scale must include the periodic testing of the hearing of all public school children by modern methods. Any school health program should not only provide for the special education of the hard of hearing child, but should also insist that every child with a significant hearing loss receive the medical care necessary to conserve his hearing.

3. Periodic health examinations of persons of all ages should include hearing tests adequate to disclose any significant loss of hearing acuity.

4. It is unwise for a physician to render an opinion regarding a case of hearing impairment unless such opinion is based on a thorough examination.

5. Early resort to speech reading and the use of a hearing aid should be recommended to all persons having a handicapping hearing loss.

6. The physician, through his interest and cooperation, can render most valuable service in the prevention and amelioration of deafness.

TREATMENT OF ACUTE INFECTIONS OF THE EXTREMITIES*

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I SHALL make no apology for presenting this apparently unimportant subject before this association, for to me it is one of the most important subjects in medicine.

The morbidity and mortality accompanying this condition is still quite alarming and, although some of the sting of former years has been taken out of the lay expression "blood poisoning," it still carries an unwarranted dread.

I know many of you are familiar with the method I am about to present but it is quite surprising to know how seldom it is employed by the medical profession in general. And in presenting this method I do not claim any originality but wish to emphasize some of the details in the technic of its application. The lack of proper attention to these details has been the main reason for poor results with the method.

Dr. E. H. Ochsner first became interested in this procedure in 1890. He had observed its application in the out-patient department of Cook County Hospital, and the results obtained convinced him that it was an advance in the treatment of infections of the extremities. After some experiments, he published his report in 1911. In his treatise he states that since employing this method he had not lost a patient from an acute infection of the extremity, had not found it necessary to amputate, not even a finger or toe, and had not a single claw hand to his credit.

The late A. J. Ochsner, in his text, Clinical Surgery, 1902, states that since the use of this treatment, out of forty-six patients coming to the hospital with such infections where hands and arms had not already been disabled by infection or treatment, not one resulted in disability or deformity, while in many of those who had been treated by incision and other forms of dressing, deformity and stiff hands were the rule.

E. H. Ochsner also demonstrated that the application of this dressing reduced the virulence of the organism present in this area. He injected material from the infected area into the peritoneal cavity of a guinea pig and caused death in a comparatively short time; after the application of the dressing for a specifid time, he again injected a much larger amount of material from the same area and there was no appreciable change in the guinea pig. Repeated experiments gave the same results.

Professor Kahlenberg, now of the University of Wisconsin, but at that time working with E. H. Ochsner, demonstrated the presence of boric acid in the urine one hour after the application of this dressing. More recently he has shown that with the feet and legs submerged in a vat of saturated solution of boric acid, boric acid appears in the urine in about one minute.

About seven years ago, in the out-patient department of the University of Minnesota, we carried out a very limited number of these same experiments. We repeatedly found boric acid in the urine in from three to six hours after the application of this dressing to the hand and arm. In three cases we injected material from the infected area into the peritoneal cavity of a guinea pig before the application of the dressing, and into other guinea pigs after the dressing had been applied for forty-eight hours. In each of the former cases the guinea pig died within twenty-four hours, while in each of the latter no appreciable change was noted in the guinea pig.

In two very small infants we noted the presence of smoky urine after the application of this dressing for twenty-four hours. On removing the dressing, the urine cleared up quite promptly. Here we had nearly 1 per cent phenol in the solution. We concluded that enough phenol had gone through to the kidney to cause the smoky urine. Since then we have used a slightly smaller percentage of phenol and have not experienced any untoward results of any kind from the application of this dressing for forty-eight hours. We now use the following formula:

Boric Acid (saturated solution)	℥	XXVIII
Alcohol	℥	IV
Phenol	ʒ	I

This is practically the same solution first suggested by A. J. Ochsner. There are solutions

*Presented before the Northern Minnesota Medical Association, at Crookston, Minnesota, September 19, 1932.

put out under the name of Ochsner that would cause necrosis of the skin if applied for forty-eight hours. We, therefore, call the solution we use the Modified Ochsner Solution.

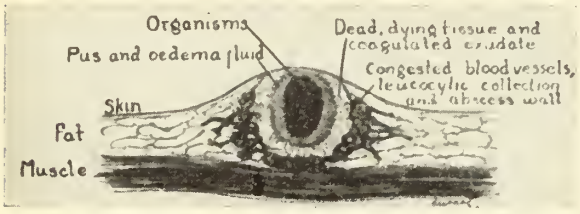


Fig. 1. Diagram illustrating the tissue changes present in an abscess.

Professor Kahlenberg demonstrated the fact that the solution of boric acid should be saturated to give proper osmotic action through the skin and, further, that few other solutions gave so prompt an osmotic action.

The reduced virulence of the organism present in the tissue has been demonstrated by experiment and by practical application. During the war we had the bacteriologist frequently demonstrate the presence of a virulent hemolytic streptococcus in the wound with a rapidly spreading infection, and in each case after the application of this dressing for forty-eight hours the symptoms had subsided and the infection had become localized.

The ideal case for demonstrating the efficacy of this treatment is the freshly infected wound on the finger or hand, with a rapidly spreading infection giving a marked lymphangitis in the arm and an adenitis in the epitrochlear and axillary areas. The proper application of this dressing to the hand and lower arm any time within the first two or three days from the beginning infection, gives the most brilliant results. We pay little attention to the lymphangitis and adenitis above, but are sure to have the dressing well above the local spreading infection. In forty-eight hours we remove the large dressing and cease to worry about the spreading infection. If the dressing has been applied before necrosis has taken place, frequently the condition has cleared up entirely and no further treatment is necessary. If necrosis has taken place and there is pus present it may break through the surface, or a small incision or puncture may be necessary to evacuate the necrotic material. If there is an open wound, a small dressing is applied and the wound kept slightly wet until drainage is complete.

We never incise an area before localizing the infection with this dressing. Stokes in 1923, in speaking of the treatment of furuncle, which is a form of acute infection, says in part: "A furuncle developing should not be incised. This is part of the surgical barbarity and irrationalism of a past generation. Here we have a physiologic walling-off and active defense of the body against a virulent organism. To go through this wall of defense by an incision is to defeat the most effective means of cure, which is the body's own natural reaction."



Fig. 2. Claw hand, with deformity and disability of hand and arm, the result of neglect and improper treatment.

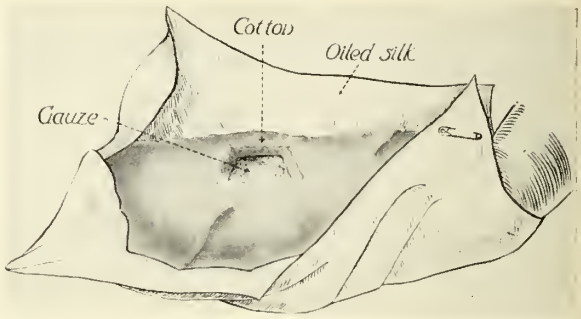


Fig. 3. Dressing ready for solution. Oil cloth is pinned tightly above and below.

We feel the same about all these acute infections. To incise before the infection is localized is to break down nature's wall of defense. By the application of the dressing first, the virulence of the organism is reduced and nature is assisted rather than obstructed.

The manner of applying the dressing is very important. Improperly applied, it usually means failure, while proper application gives brilliant results.

The dressing should be large and extend beyond the local infected area. It should be made as nearly air-tight as possible. Plain gauze should be in contact with the skin and entirely encircle the extremity. This serves as a capillary

distributor of the solution over the skin. Next should be a heavy layer of absorbent cotton. This serves as a reservoir for a large amount of solution which is fed to and distributed by the gauze. On the outside should be a rubber or oil cloth covering entirely encircling the whole dressing and pinned very firmly along the top and ends. This serves to prevent evaporation and presses the solution in toward the skin. If properly put on, the dressing results in an almost air-tight chamber and resolves itself into a hot dressing without external heat.

The dressing should in no way be disturbed for forty-eight hours except to take out one or two pins along the top in order to pour on more solution two or three times a day. In a dressing over the hand and lower arm we usually pour on about one quart of solution when the dressing is applied, then about one-third of that amount twice daily for two days.

I have gone at length into these seemingly minor details, for I am convinced that it is lack of attention to these that has prevented the more general use of this treatment.

Our observation of the cases that come into the out-patient Department of the University of Minnesota leads us to conclude that this is frequently a poorly treated condition, while the reports from those who have learned to use this method properly are very gratifying. I have yet to see a physician, who has learned to use this method properly, resort to other methods.

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ABSCESS OF THE MEDIASTINUM*

REPORT OF CASE

H. J. Lloyd, M.D., and R. G. Hassett, M.D.,
Mankato, Minnesota

MASSIVE suppurations in the lower posterior mediastinum are rare occurrences, or are seldom diagnosed and reported. The upper or anterior mediastinum is more frequently involved, due to its closer relationship with the head and neck, where suppurations frequently occur. General mediastinitis without abscess is a very common affliction.

Review of the literature shows considerable discussion of the subject, but few case reports. Most of those reported terminated fatally. Wagner of New York reports one case recovering after operation. Balero reports a case of spontaneous recovery. The consensus of opinion is that this is a very serious condition, and that the prognosis is usually grave.

Etiological factors may be classified as follows: (1) suppurations about the tonsils and the pharynx; (2) suppurations in the structures of the neck; (3) operations on the esophagus, larynx and trachea; (4) acute infections in some part of the mediastinum, involving the lymph glands; (5) trauma,—penetrating wounds of the thoracic cavity; (6) spinal caries, due to tuberculosis; (7) hematogenous origin; (8) idiopathic.

Symptomatology.—Pain in the anterior part of the lower chest is a most constant symptom. It is persistent and of a dull, boring, throbbing character. Radiation is usually downward to the epigastrium and outward along the costal arch. At the same time there is a dull ache in the lower dorsal region close to either side of the spine. Cough may not be present at first, but nearly always develops later in the course of the disease. It is of a dry, irritating, non-productive charac-

*Read at the meeting of the Southern Minnesota Medical Association held at Rochester, Minnesota, on September 12, 1932.

ter. Temperature is of a septic type and may rise to 105 degrees or more. The pulse varies with the temperature. Chills and sweats are common. The patient is sicker than the chest findings would warrant, especially early in the disease.

Physical findings.—The diagnosis by the ordinary methods of examination test the acuity of the physician to the utmost. There is usually tenderness on deep palpation just below the ensiform process of the sternum, and on either or both sides beneath the costal arch. There is some engorgement of the veins in the supraclavicular regions and some cyanosis of the face and neck. Percussion of the chest may reveal only a slight dullness posteriorly on either side of the spine over the lower lobes. Auscultation reveals normal breath sounds over the entire chest except in the dull areas noted above, where a few "sticky" moist râles can be heard. A slight pericardial friction sound may be heard at the base of the heart. Otherwise the cardiac findings may be normal.

X-ray findings.—The X-ray examination is the most important procedure of all. At first only an irregularity and haziness of the outline of that part of the diaphragm situated below the cardiac shadow may be seen. A few days later, the definitely formed abscess may be outlined. In every case of suspected mediastinal infection, too much emphasis cannot be placed on the necessity of X-ray examination every three or four days. If not done, an abscess may be missed. Stereoroentgenograms should be made to determine the location of the abscess in the antero-posterior plane of the mediastinum. Lateral views may be misleading and should not be depended upon.

Prognosis.—Without early diagnosis and treatment, the mortality is over 50 per cent. The mortality is high even with early operative procedure.

Treatment.—Early diagnosis and early operative procedure are essential to success.

CASE REPORT

Miss L. B., aged 21, a public school teacher, was admitted to Immanuel Hospital on April 9, 1932. She complained of pain in the lower substernal region, radiating to epigastrium, right hypochondrium and sometimes to the right subscapular region. The pain was of a dull throbbing character, was persistent and was intensified by deep inspiration. Her temperature reached 102 degrees F. on the day of admission. No cough, chills or sweats were present at this time.

Onset of the disease had occurred about two weeks previous to admission. She had acquired a mild cold and sore throat. These had subsided in a few days and then the pain in the chest developed, which increased in severity until she was admitted to the hospital.

Previous history.—The patient had had the usual mild diseases of childhood. No serious disease had developed until October, 1931, when a perirectal abscess was opened and drained. It healed very slowly and left a discharging fistula, which closed only a short time before the onset of the present trouble. Except for the discomfort of this fistula, she had felt well and was able to follow her occupation without loss of time. There was no family history of tuberculosis, except that her mother had suffered from chronic bronchitis when the patient was a child. At the present time, her parents and three brothers are in excellent health.

On admission, the patient appeared to be in fairly good condition. Temperature, 102 degrees F.; pulse 80; respiration 24; hemoglobin 78 per cent; leukocytes, 10,000 with a differential count of 80 per cent neutrophiles, 10 per cent lymphocytes, and 10 per cent myelocytes. The urinalysis showed a trace of albumin and grade 3 in pus cells. Physical examination revealed very few findings. The throat was slightly reddened, but no exudate was present. There was no enlargement of the cervical glands. The veins of the neck were moderately distended. Normal resonance was found over the entire lung area, except over the right lower lobe near the spine, where a small area of dullness was noted. In this area a few "sticky" moist râles were heard. The breath sounds in the right lower chest seemed faint and distant but were otherwise normal. The heart was normal in all respects. Nothing abnormal was found in the abdomen or pelvis.

In spite of medication for relief of the symptoms, the pain persisted and a slight cough developed on the third day. X-ray of the chest on April 11th showed increased hilus shadows, a slight mottling of the lower lobes, and a ragged appearance of that part of the diaphragm just below the heart shadow. There was slight improvement for a few days and then the pain increased in severity, especially in the lower right dorsal region. The temperature climbed slowly and steadily day by day. She began to experience some pain on deglutition. Septic symptoms developed, with slight chills and sweats at night. The leukocytes increased to 24,000 by the 21st of April. X-ray examinations made on April 20th and 22nd revealed a globular density superimposed upon the heart shadow. Stereoroentgenograms showed it to be posterior to the heart and located in the posterior mediastinum. Paracentesis of the anterior mediastinum gave no results. The needle was then introduced into the posterior lower right chest about two inches from the spine, and about 10 c.c. of bloody purulent material was obtained. Microscopic examination of this material showed pus cells in abundance, but no bacteria. Stain for tubercle bacilli was negative. These examinations were made on April 21st and 22nd.

From these findings, a diagnosis of mediastinal abscess was made. The patient was rapidly becoming

worse. Pulse was 130, respiration 28 and temperature 105 degrees. On account of her desperate condition, it was considered that her only chance for recovery lay in operation and evacuation of the abscess, if possible.



Fig. 1. X-ray taken April 11, 1932, showing the ragged outline of the middle portion of the diaphragm. This indicates an acute mediastinitis.

This was done on the evening of April 22nd. Posterior mediastinotomy was performed successfully and the abscess located and drained. There was abundant drainage of bloody pus, and the patient apparently improved for two days. She then developed a severe cough, became dyspneic and cyanotic at times, and more septic symptoms appeared. Blood transfusion was given on April 24th. Numerous coarse moist râles appeared in the left lower chest and all breath sounds had practically disappeared from the right lower chest by the 25th of April. Loud bronchial breathing was heard in the right upper chest.

In spite of all efforts for the support of the failing heart and respiration by oxygen inhalations and other means, the patient failed rapidly, and died on the afternoon of April 27th, five days after the operation.

Autopsy was requested and obtained. There was massive collapse of the right lung, and the right pleural cavity contained a large quantity of thin bloody pus. The left lung showed a pneumonic process in the lower lobe, which was riddled with abscesses. None of these were more than a centimeter in diameter. This lower lobe was quite firmly adherent to a portion of the diaphragm. The left upper lobe was slightly congested, but was free from abscesses. The tissues and lymphatic structures in the posterior mediastinum were badly disintegrated. No intact glands could be found. The abscess area had been properly entered and drained by the operation. The heart and pericardium were free from any infective process. There was no evidence of spinal caries. The abdominal organs were normal.

The causes of death were recorded as: (1) multiple abscesses of the left lung, and (2) massive collapse of the right lung.

COMMENT

In this case, the etiological factors were difficult to determine. No bacteria were found in the pus. The perirectal abscess occurring six months before might have had a definite relationship, and was probably tuberculous in origin. This we

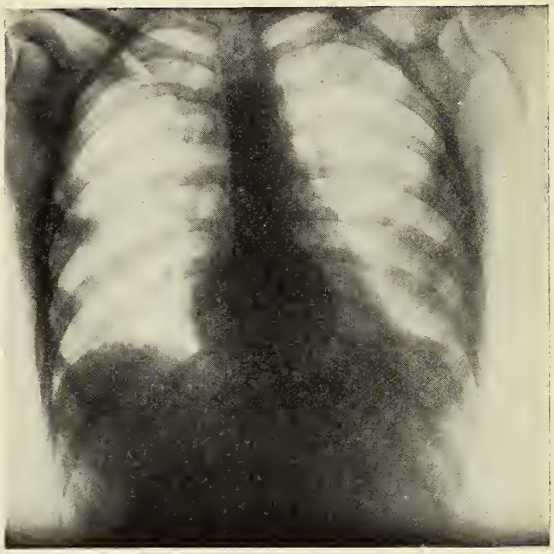


Fig. 2. One film of a stereogram taken April 21, 1932, showing a large globular density in the posterior lower mediastinum.

were unable to prove, but it is the most likely to be correct, for it is the consensus of opinion that anal fistulæ are usually tuberculous in origin. Secondary infection of broken down tuberculous glands seems to be the most likely explanation of the cause of this mediastinal abscess.

Mediastinal abscess presents one of the most difficult problems in diagnosis and treatment. The obscurity of the symptoms and the uncertainty of the etiological factors concerned make it worthy the attention of those in general practice, who are the ones that are most likely to encounter such cases in their early stages. Delay in diagnosis and treatment, such as was probable in this case, makes the possible recovery from this rare and dangerous complication quite remote.

DISCUSSION

Dr. R. G. Hassett (Mankato, Minn): In considering the surgical aspects of this case, I think it best to review briefly the surgical anatomy of the mediastinum.

The mediastinum is described as that region of the chest cavity between the pleuræ laterally and the thoracic walls anteriorly and posteriorly. That portion above the upper level of the heart is the superior mediastinum and that portion below this level is designated as the inferior mediastinum. The inferior mediastinum is divided into anterior, middle and posterior mediastinum, the anterior being in front of the heart, the posterior behind the heart and the middle enclosing the heart. The superior mediastinum contains the great vessels that emerge from the heart, the nerves in this region, the esophagus, trachea, thymus (or its remains),

and the broncho-lymphatic glands. In the inferior mediastinum, the important structures are found in the middle and posterior mediastinum. These include the heart and its pericardium, the ascending and descending aortæ, superior vena cava, right and left pulmonic veins, bifurcation of the trachea, greater and lesser azygos veins, esophagus, phrenic, pneumo-gastric and splanchnic nerves. The mediastinum for clinical purposes, however, is divided into the anterior and posterior mediastinum by a vertical line drawn through the bifurcation of the trachea. Accordingly, the clinical syndromes are designated as either anterior or posterior, and not as superior or inferior mediastinal with its anatomical divisions.

Acute suppurations of the mediastinum are most frequent in the anterior mediastinum. In a report of thirty-six cases, Hare of Philadelphia found thirty in the anterior, four in the posterior and two involving the entire mediastinum. Abscesses of the anterior mediastinum, in a great percentage of cases, burrow through the thoracic wall and present themselves in the skin at one side or another of the sternum. This is most commonly found in the second interspace and close to the left border of the sternum. Where this is evident, the surgical procedure is comparatively simple. After exploratory puncture, the needle being directed downward and finding pus, an incision is made along the costal cartilage, resecting it free at the costochondral articulation, and the abscess opened along the sternal margin. Where the abscess is behind the sternum, trephining the sternum with a trephine or a dental bur after exposing the sternum is a classical procedure. Occasionally, abscesses of the anterior mediastinum may point to the neck region, where they may be reached for drainage by the collar incision one-half to three-fourths inches supraclavicular.

Abscesses of the posterior mediastinum also at times point to the posterior neck and are evidenced by supraclavicular edema. In these cases, the procedure carried out is an incision made along the posterior border of the sterno-mastoid muscle, retracting the great vessels forward and inserting the finger along the esophagus to the front of the spine. The cavity is entered, evacuated and drained.

Suppurations deeper in the chest are reached by a dorsal mediastinotomy. This operation was first done by Potarca of Bucharest in 1895, and later technically improved by Bryant, and is now known as Bryant's operation. This consists of an osteoplastic flap three or four inches square over the site of the abscess. A three sided incision is made, the fourth being represented by the spinous processes of the vertebræ. The thick flap of skin and subcutaneous tissue is reflected back over the spine. A longitudinal incision is made over the middle rib, through the periosteum from the transverse process to the angle of the rib. The periosteum is freed and a gigli saw passed between the rib and the periosteum. This rib is resected and discarded. The other two ribs are divided between pairs of drilled holes in like manner. These holes are used in fixing the ribs when they are restored to their original position. The intercostal nerves are retracted to protect them from injury. The periosteum, forming the bed of the central rib, is divided longitudinally and the pleuræ underneath is separated bluntly with the finger for the extent of the original wound. The incision is carried up and down at both ends of the wound, giving one an H shaped incision. Now, we have two small flaps containing sections of ribs. These are reflected upward and downward exposing the lower posterior mediastinum.

This was the procedure carried out in our case, except for some slight changes in technic, which hastened the operation. The usual site of the incision in Bryant's technic is over the fourth, fifth and sixth ribs, but in our case, due to the low position of the abscess, as seen on X-ray, the incision was made over the ninth, tenth and eleventh ribs on the right side, which was directly over the abscessed area. The tenth rib was resected under gas anesthesia and by careful blunt dissection, the abscess was approached and felt as a redundant mass, which pulsated with the cardiac movements. An opening was bluntly made and approximately 150 c.c. of thick purulent material withdrawn. The left pleural cavity was accidentally opened during the dissection, due to the friable condition of the adherent pleuræ in the region of the abscess, and from this a sero-purulent exudate was obtained. Soft fenestrated rubber drains were fixed in place in both the abscessed area and the left pleural cavity. Closure was hurriedly made due to the poor condition of the patient. The following day, drainage was copious. The general condition of the patient was considerably improved. Her condition, however, changed the second day and decline was gradual until she expired on the fifth post-operative day.

CONGENITAL ABNORMALITIES OF THE GENITO-URINARY TRACT AND THEIR SURGICAL TREATMENT*

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IN considering treatment of certain congenital abnormalities of the genito-urinary tract, I am going to refer particularly to undescended testis, hypospadias and exstrophy of the bladder with complete epispadias and complete absence of urinary control. I think it can be accepted without debate that surgical treatment of these abnormalities produces not only satisfactory, but in many instances surprisingly excellent results.

UNDESCENDED TESTIS

The undescended testis, or testes, should be brought down into place in the dependent portion of the scrotum, before the patient has reached the age of puberty, preferably when he is between the ages of six and ten years. Some

*From the Division of Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Northern Minnesota Medical Association, Crookston, Minnesota, September 19, 1932.

method should be employed which will maintain the testis in the depth of the scrotum. A testis placed in a normal position in the scrotum before puberty will usually increase normally in size and should function satisfactorily not only from the standpoint of production of internal secretion, but also from the standpoint of spermatogenesis. The undescended testis may lie in the abdomen, in the inguinal canal, or at the external ring. All cases of intra-abdominal testis are associated with hernia, and in many instances in which the testis is in the inguinal canal a hernial sac is present. This hernial sac must be excised and the inguinal canal must be partially closed as a part of the plastic operation for cryptorchidism. One of the prerequisites to a satisfactory operation for cryptorchidism is that after division of the connective tissue around the ductus deferens and the spermatic artery, and veins the structures of the spermatic cord should be of sufficient length to enable one to place the testis in some part of the scrotum. In addition, it must be so placed in the scrotum that it is not in contact with the pubic tubercle, where it is more susceptible to injury than if it were intra-abdominal or in the inguinal canal. In any operative procedure intended adequately to correct the position of undescended testis, the scrotum should be stretched to sufficient size to allow the testis to be placed in its dependent portion, which keeps the testis away from the pubic tubercle. Two operative procedures satisfy these requirements. In one, which is used by Cabot, traction is placed on the testis and part of the scrotum by an elastic rubber band which is tied to a suture that extends through the gubernaculum of the testis and the lower part of the scrotum; the rubber band is temporarily fastened to a metal crutch that bears on the perineum in such a way that traction can be maintained. A second method is similar to one described by Keetley and by Torek and made generally known by Meyer. It consists of an operation in two stages. At the first stage, the testis is brought out through an incision in the scrotum and is attached to the fascia lata of the thigh. Following this procedure, the patient is able to return to his activities within a period of two weeks. Two or three months later, or at any convenient time thereafter, the second stage of the operation is carried out, in which the scrotum is separated from the skin of the thigh, and the testis from the fascia lata of the thigh. It will then be found that the testis can be replaced in the depth of the scrotum, which is of normal size. The patient is usually able to leave the hospital the day following the second stage of the operation, which can be carried out satisfactorily under local anesthesia.

I have performed this operation in more than fifty cases with very satisfactory results, as determined by the size of the testis and the maintenance of normal position in the scrotum after operation. When cryptorchidism is bilateral, I have lately been performing the first stage on both sides at one operation, therefore necessitating return of the patient to the hospital for but a day or two when the second stage is carried out.

HYPOSPADIAS

The treatment of hypospadias should be confined to, first, correction of the deformity of the penis, and second, to advancement of the urethra from its perineal position to a site as near as possible to the end of the penis, enabling the patient to pass his urine while standing. Correction of the curvature of the penis by division of the connective tissue band which occupies the position of the abnormally obliterated urethra and corpus spongiosum urethræ should be made at an early age, say when the patient is aged three or four years. It can usually be effected by making multiple transverse incisions through this contracting cord, which has bent the penis as a bow-string bends a bow. If the patient is not seen until after puberty, it may be necessary to use skin grafts to replace the area denuded of skin by such transverse incisions. In some such cases the use of a tunnel skin graft is reported by Hagner to be successful. In general, correction of curvature of the penis is a relatively simple mechanical procedure, whereas advancement of the urethra is exceedingly complicated and difficult, and usually requires, to obtain any measure of success, multiple operations spread over a period of years.

It is my opinion that hypospadias of the penile type, in which the urethral opening is on the penis but just short of the end of it, should be left alone. On the other hand, the perineal type of hypospadias, in which the urethra has terminated in the scrotum, should be corrected surgically. One method of correction consists in free-

ing the urethra from its attachment in the perineum, advancing it to the base of the penis, and then again up the under-surface of the penis.

Another method which has worked out successfully in several of our cases has been to form a channel by using a flap of the scrotum, first attaching the penis to the scrotum, and at a second stage raising the skin flap from the latter. Illustrative of this is the result obtained in Figure 1, with a child now aged eight years, correction of whose penile deformity was begun at the age of four years and a urethra made by using a portion of the skin of the scrotum.



Fig. 1. Result of operation for hypospadias.

EXSTROPHY OF THE BLADDER

Under the heading of exstrophy of the bladder I also shall include cases of complete epispadias, in which the bladder, although situated on the interior of the abdominal cavity, lacks a urethra and consequently the urine flows constantly from the partially open vesical cavity that is visible above the symphysis pubis. Similarly, I shall include cases of congenital abnormality of the urethra, in which failure of development of the urinary sphincter muscles has occurred, with complete urinary incontinence since birth.

In the treatment of these conditions, transplantation of the ureters into the sigmoid colon, with subsequent removal of the bladder if exstrophy is present, is followed by excellent results. The rectum serves as a reservoir for the urine, and almost without exception the patients on whom the procedure is carried out are able to hold the urine in the rectum without leakage for from four to six hours during the day. Many of them are able to retain the urine in the rectum the entire night. Experience has led to the belief that the safest method of ureteral transplantation is one described by C. H. Mayo in 1917, in which the ureters are transplanted separately, with an interval of ten days or two weeks between transplantation of them. Carrying the ureter between the mucosal and muscular layers of the sigmoid or rectal wall, which is Coffey's principle (as experimentally applied to the common bile duct and ureter in dogs), has, by valve-like action, prevented ascending infection to the kidneys in most of the cases. Clinical evidences of this may be found in the general feeling of "good health," with normal growth, of children, and the absence of lumbar pain, chills, or fever. In many cases, fifteen to twenty years have elapsed since the ureterosigmoidal transplantation.

In April, 1931, I presented a summary of the results in seventy-six cases of exstrophy of the bladder, including cases of complete epispadias, in which operation was performed in the clinic by a method described by C. H. Mayo. This number has now increased to eighty-four. In the last seven years, I have operated in twenty-four of these cases; in nineteen for exstrophy of the bladder, in three for complete epispadias, and in two for congenitally deformed or traumatized urethras with total urinary incontinence. The mortality rate, calculated on the basis of cases, in the entire group, as well as in my series, was approximately 4 per cent; calculated on the basis of operations, the mortality rate would be even less.

It was C. H. Mayo's experience, and it has been mine, that it is unnecessary to use either tubes or catheters in transplantation of the ureters to the sigmoid colon if one ureter of normal size is transplanted at a time. Our experience has proved that in the treatment of exstrophy of the bladder and other congenital abnormalities of the bladder and urethra, with total incontinence, the risk of such operations is very much less among young children than that of simultaneous bilateral ureteral transplantations.

Time does not permit further discussion of the relative merits of these two procedures. How-

ever, the comparative risk of the two types of operations is striking. In addition to the less risk of ureteral transplantation when one ureter is transplanted at a time, is the fact that the length of time necessary for patients to recover in the hospital is approximately the same as with bilateral simultaneous transplantation. Although our series included several cases in which, in addition to transplantation and removal of the bladder, a plastic operation was done on the penis, either at the time the bladder was removed or shortly afterward, the average time spent in hospital was not longer than that required of simultaneous transplantation of both ureters.

In a comparison of the postoperative progress in the two groups of cases, it was noted that the reactions from operations were strikingly more severe and more prolonged as indicated by irregularity of fever and increase in pulse rate when both ureters were transplanted simultaneously. When one ureter is transplanted at a time, the postoperative reactions are usually moderate or slight, the period of fever and increase of pulse rate lasting only for a few days subsequent to the transplantation; following transplantation of the second, or left ureter, very little reaction occurs. With the patient in good condition, removal of the exstrophied bladder and a plastic operation on the penis are both regarded as operations without appreciable risk.

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TREATMENT OF INTRACAPSULAR FRACTURES OF THE HIP*

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DURING the past few years there has been renewed interest in the treatment of intracapsular fractures of the hip because the end-results of this fracture are so frequently unsatisfactory. The report of the commission of the American Orthopedic Association in 1929[1] revealed that bony union was obtained in about 52 per cent of these cases as treated in the better clinics of our country by closed methods. Open surgical treatment, which was employed in the best hospitals by highly trained surgeons who selected their cases, yielded bony union in 86 per cent of the cases. The results obtained by the profession at large are probably not nearly so good.

Since the appearance of the above statistics much work has been done upon this subject. Additions have been made to our knowledge of the factors which make intracapsular fractures of the hip so different from other fractures and therefore so difficult to treat satisfactorily. Several new methods of closed treatment have been introduced to the profession, and there are now available at least half a dozen different methods of open surgical attack. A rather brief consideration of these various methods now at hand

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should be of value to the general physicians and surgeons who are treating by far the majority of these cases.

CLOSED METHODS

1. The oldest, simplest, and best known of the closed methods of treating intracapsular fractures of the hip is by simple adhesive traction. It is my opinion that this form of treatment will remain for years the method of choice in certain cases. The frail, elderly patient, who is already suffering from constitutional disease, does not tolerate manipulative reduction and long periods of absolute immobilization. Common sense insists that as little as possible be done in such cases and that the life of the patient be considered first and the fracture second. By use of a gas-pipe Bradford frame to facilitate nursing care, simple Buck's extension with counter extension through elevation of the foot of the bed, and long sand bags to aid in immobilization of the extremity, such patients can usually be treated in comfort and often recover completely.

2. The Carl Jones traction device has attracted some attention recently. The merits claimed for it are simplicity of application and the ability of the patient to assume the sitting position at will. In this appliance, however, both lower extremities are held immovable side by side. Counter traction is exerted upon the sole of the sound foot, but the dorsum of the foot of the injured extremity carries the burden of the traction which is powerfully exerted by a screw. This leads to pressure ulcers in spite of heavy padding, and the position of the extremities adds to the discomfort of the patient.

3. The Whitman cast treatment has deservedly become the routine method of closed treatment. When properly applied under traction with maximum abduction and strong internal rotation, the Whitman cast method results in bony union and good function in approximately 60 per cent of the cases.

4. The Thomson modification of Whitman's method, which maintains abduction of the injured hip with certainty by abducting the sound hip as well and including both in a double plaster of Paris spica cast, is more efficient.

5. Cotton's Artificial Impaction adds still more to the Whitman-Thomson method. Internal rotation is secured under strong traction on the Hawley table in abduction, and then a heavy "following" blow is struck with a large mallet on the padded trochanter while the sound side of the pelvis is braced by an assistant. When this artificial impaction has been achieved, the extremity no longer flops outward into external rotation, and the fracture can be treated as an impacted one. By adding artificial impaction to the Whitman method, as modified by Thomson, we have secured bony union and good functional results in 75 per cent of all cases.

6. Böhler, the Viennese authority on fractures, employs skeletal traction by means of a rustless steel pin through the tuberosities of the tibia. Nevertheless he still considers the Whitman method the "best for young people and older ones, who are not likely to suffer any serious complications." Skeletal traction, however, requires strict aseptic technic, and on this account is somewhat limited in its application.

7. The Roger Anderson Well Leg Counter Traction Splint also employs skeletal traction exerted by means of a pin through the tibia. This appliance, while superior to the Carl Jones device, likewise holds the extremities immovable in side by side extension. The patient can assume the sitting position, however, and the traction element is more scientifically applied.

OPEN SURGICAL METHODS

1. Albee[2] recommended his tibial bone graft in these cases in 1913. The operation is an excellent one but requires three incisions and unusual operative skill.

2. The operation of nailing the trochanter onto the femoral head has been done in various ways for many years but without enough uniformly good results to standardize the procedure. Smith-Peterson,[3] however, has introduced a three flanged nail from the trochanter into the head. The fragments are impacted in the operation, and excellent fixation is secured without external immobilization. Proved bony union has been secured by Smith-Peterson in 86 per cent of his series. The operation requires considerable operative skill, and its results in some other clinics have not been so good.

3. Magnuson's operation[4] consists of reaming out the distal side of the head and freshening the neck of the femur so that the head fits over the neck like a cap. He also reports good results, particularly in cases of delayed or non-union.

4. Bozsan of New York[5] has recently at-

tacked the problem by exposing the fracture and drilling into both sides to establish increased circulation across the fracture line. This procedure has long been employed with good results in cases of delayed or non-union of other bones and is especially advocated by such authorities as McMurray and Böhler. Bozsan's treatment offers no improvement in fixation.

5. Hey Groves of Bristol, England,[6] reported his "proximal pegging" operation in 1929 with which he gained bony union in four out of five cases. This operation is obviously correct mechanically and should be superior to any form of blind pegging from the trochanteric side. It is open to the objection that the head must be turned out of the acetabulum and thus, in a true intracapsular fracture, is totally free of soft part attachments.

6. In 1930 I attempted to verify the mechanics of Hey Groves' operation by experimentation and to determine the fate of a femoral head devoid of all soft part attachments. I found that in a proximal osteosynthesis[7] operation in dogs the round nail failed to hold without external immobilization and that all dogs immobilized in plaster died from complications. The author then devised a rustless steel screw which could be introduced through the head and neck from either the proximal or trochanteric side across an intracapsular osteotomy. Unless sepsis intervened, these animals gained bony union and good functional hips.

My conclusions from these experiments were that early continuous and accurate contact, with absolute fixation of the fractured surfaces, is of paramount importance in intra-capsular fractures of the hip. Early functional stimulation of the circulation is also important, and the progress made in the future will undoubtedly be along such lines of treatment. At the present time there is a place for osteosynthesis in certain selected cases in good hospitals having an especially trained personnel.

6. Ellis Jones[8] has recently offered his operation of trochanteric transplantation in these cases. He exposes the fracture laterally and utilizes a peg cut from the trochanter as a key graft across the fracture line. His exposure of both fragments overcomes the objections to operations of the blind pegging type. The autogenous bone peg simultaneously furnishes dead tissue, available local calcium, and fixation of the fragments. It is the best method of open surgical attack available today, but, of course, must be reserved for selected cases.

NON-UNION

Non-union, in intracapsular fractures of the hip, is most frequently due to failure to secure the conditions stipulated above. Perhaps the commonest cause of failure is faulty reduction. It is absolutely necessary to secure accurate and close contact of the fractured surfaces in these cases; otherwise the synovial fluid dilutes the ferments essential to the healing process in bone. Another common cause of non-union is lack of continuous apposition of the fractured surfaces. All traction appliances, splints, and casts require careful inspection frequently to maintain their efficiency.

Impacted fractures of the hip usually result in bony union regardless of the method of treatment employed. "Bone and soft part circulation are of prime importance in the process of calcification of fracture healing" according to Murray[9] and "should be the prime objects of attention early in the healing process." The retardation of the local circulation alone may account for the failure of the Whitman method in those cases where the method has been properly and efficiently applied, yet non-union results. Early functional stimulation of the circulation is of great importance in the healing process of all fractures.

TREATMENT OF NON-UNION

1. The commonest aid offered the patient who has a non-union of a fractured hip is the crutch. The modern walking caliper splint is vastly superior to a crutch. When properly applied, this splint takes the patient's weight upon the tuberosity of the ischium. With the aid of a cane patients can be ambulatory in such a splint and really independent of other help. Sometimes cases of apparent non-union go on to bony union in such ambulatory splints, and this is due, no doubt, to the circulatory stimulation of active function.

2. The Albee bone-peg operation, mentioned above, is one of the oldest methods of surgical attack on cases of non-union. It gives good results in selected cases, as shown by Henderson,[10] but requires unusual skill.

3. The Ellis Jones trochanteric transplanta-

tion, also described above, is probably an improvement in technic and permits earlier functional stimulation of the healing process.

4. Reconstruction. There are many patients with non-union whose physical condition is good but who are not suitable for osteosynthesis operations which utilize the head of the femur. I refer to those cases in which the head is necrotic as shown by X-ray or those in which there is marked displacement with the trochanter wandering upward. Necrosis of the head is evident on X-ray by its apparent increased density. An ununited femoral head which presents atrophy on the X-ray certainly has circulation within it, and therefore possibilities for its further utilization.

When the head becomes necrotic it is really a sequestrum and should be excised, providing the general condition of the patient permits further surgical attack (Fig. 1). This class of patient is often neglected and can be greatly benefited by the Whitman reconstruction operation. In this operation the necrotic head is excised, the trochanter is cut off with its muscular attachments, and the shaft is reshaped and placed in the acetabulum (Fig. 2). When the trochanter is reattached lower down on the shaft and the capsule carefully sutured, a serviceable, painless, and good functional hip should result (Fig. 3). The procedure is an excellent one, when properly done, and deserves wider recognition by the profession.



Fig. 1. Long standing non-union with living head.



Fig. 2. Reconstruction operation with rustless steel nail re-attaching trochanter.



Fig. 3. End result after removal of nail.

CONCLUSIONS

1. The best methods of treatment for intracapsular fractures of the hip are considered herewith.

2. Simple adhesive traction remains the method of choice in patients whose general condition will not tolerate more extensive treatment.

3. The Whitman cast method, with Thomson's modification plus Cotton's artificial impaction, is still the best treatment for the majority of cases of intracapsular fracture of the hip.

4. Experimentation has shown that continuous and accurate contact with absolute fixation of the fractured surfaces is all-important in these cases; and that early functional stimulation of the circulation is likewise important.

5. Ellis Jones' trochanteric transplantation is the best method of open surgical attack on fresh cases that is available today, but it must be reserved for selected cases.

6. The modern walking caliper splint is a great aid to the patient with non-union who is not amenable to or suitable for further surgical attack.

7. Whitman's reconstruction operation is excellent in certain cases of non-union, and it deserves wider recognition by the profession.

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DACRYOCYSTITIS IN INFANTS

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THE infant does not usually fix the eye until about six weeks old, and coördination is not well developed under three months of age, but the pupils react to light almost immediately after birth. The lachrymal gland is not developed at birth and tears are not shed, as a rule, before the age of about three months.[1] If at a later age the infant's vitality is profoundly affected, suppression of tears occurs, and a return is a favorable prognostic sign.

The accessory glands supply moisture to the conjunctiva and cornea in early infancy, and also after the extirpation of the lachrymal gland. Before the lachrymal gland begins to function, epiphora does not occur.

In infantile dacryocystitis there is a little mucus or muco-purulent discharge in the conjunctival sac. It is not accompanied by much conjunctivitis. The diagnosis is made by gently pressing over the lachrymal sac, when mucus or muco-purulent material will be expressed at the lower or upper punctum lachrymali or at both. Parsons says that the streptococcus pyogenes is especially associated with phlegmonous dacryocystitis, and the pneumococcus with the simple type although it is seldom found in pure culture.[2]

According to Rochon-Duvigneaud, in the fetus the lower end of the nasal duct is closed by a thin membrane. Delay in perforation results in dacryocystitis, the mechanism being a decomposition of the gelatinous contents of the lachymal passages with a resultant inflammation.[3] Donald Gunn says that obstruction at the lower end of the nasal duct is due to lack of development, rather than swelling or stricture of the canal following infection.[4] Fage states that infection may originate in the conjunctiva but more frequently starts in the nasal chambers in arrested development with occlusion of the inferior meatus of the nasal duct. It is never due to ophthalmia neonatorum.[5] In hereditary syphilis, a dacryocystitis may occur during intra-uterine life and result in a congenital fistula of the lachrymal sac.

Congenital malformations of the lachrymal puncta, canaliculi, sacs, nasal ducts, or inferior meati of the nose occur very seldom.

According to Theobold, atresia of the punctum as an acquired anomaly is rare; only a few cases have been reported. Traumatic obstruction in the lachrymal apparatus may be caused by partial destruction of the lid, by injuries, by caustics (such as lime), by smallpox pustules, and by chancre of the lid.[6]

Lachrymal obstruction in the newborn is not as uncommon as was once supposed.[7] In 1884, E. Williams, Professor of Ophthalmology in Miami Medical College, wrote, "In the few cases of suppuration of the tear sac in infants that I have met with . . ."[8]

All five cases of simple infantile dacryocystitis seen in private practice by the writer during the past twelve years were caused by delayed perforation of the lower end of the nasal duct. All recovered—four with probing, one without. Treatment of these cases generally requires probing, but not invariably, as the perforation may have occurred subsequently to birth, yet the passages remained obstructed by the inflammation in the lachrymal canal. In one of the five cases, instillations of adrenalin followed by very weak silver nitrate solution removed the inflammation, cleared the passages and established drainage. This treatment proved insufficient in four of the cases but cure was obtained through probing.

If the lower end of the nasal duct is imperforate, probing will probably be necessary, although it is conceivable that instillations into the conjunctival sac may establish an opening, or the duct become patent during treatment in the natural order of events. Irrigation with Anel's syringe may cause a break in the membrane. It is well to begin treatment with instillations into the conjunctival sac of weak adrenalin and weak silver nitrate solutions.

Frederick Ridley, in a recent report to the Royal Society of Medicine, states that silver nitrate alone may kill bacteria in the tears and on the surface of the conjunctiva before it is rendered ineffective by dilution. It is converted into insoluble silver chloride by the sodium chloride of the tears and tissues. Silver chloride has a bactericidal and inhibitory action. Not only is the silver chloride effective in relatively small amounts, but since it is precipitated in the superficial layers of the conjunctiva it may be assumed to exert a powerful inhibitory effect until the superficial cells are removed. Silver nitrate is by far the most efficient of the substances examined, and the results suggest that it might be used with advantage in concentrations much weaker than those commonly employed.[9]

If instillations are not successful, Anel's syringe offers a possible means of rupturing the membrane by forcing a solution through the lower end of the nasal duct.

Pressure made by the finger over the lachrymal sac may rupture the membrane if the membrane is very delicate.

It seems to the writer, however, that the use of the probe is more certain to be successful in the majority of cases. Fraser says that in children palliative treatment, such as the passage of probes, is much more likely to prove successful than in adults.[10]

Probing the tear passages in infants is apparently much less painful than in adults. A general anesthetic is unnecessary.

In one infant, four months old, I instituted the adrenalin-silver treatment which was carried on at home by the nurse without improvement. After a reasonable period of trial the infant was taken to the hospital and the lachrymal passages probed under a general anesthetic. This resulted in no improvement but after five successive probings at the office at four to five day intervals the eye became well and has remained so seven years.

In another infant, four weeks old, probing was done at the office at weekly intervals. The eye was well in four weeks. In my fourth case, an infant of four months, treatment by probing was carried on in the office for about five weeks, when the discharge ceased and did not recur.

Probing was successful in two weeks in the fifth case, that of an infant seven and a half months of age.

The probing of an infant's lachrymal tract, in cases of dacryocystitis, does not require a general anesthetic; it is not necessary to slit the canaliculus and the pain of probing can be almost wholly prevented by the use of a local anesthetic. The infant is wrapped in a sheet and placed upon a pillow, the body is held by a nurse and the head is held securely by an assistant. Gentle pressure empties the lachrymal sac; the conjunctival sac is irrigated with boric acid solution from a dropper. A tiny bulb of cotton on a fine steel applicator is dipped in a solution of cocaine hydrochloride, the excess of solution being pressed out. The lid is slightly everted while the cotton is held in contact with the lid at the lower punctum. The action of the cocaine is limited to that site. A greased Number 1 Theobold probe is passed to the lachrymal sac, followed by a Number 2 Theobold probe. Immediately after this a Number 1 Bowman probe is passed to the lower end of the sac into the nasal duct and through the duct to the inferior meatus of the nose where it may be seen or felt with a probe, external to the inferior turbinate. Four days or more later Number 1 and Number 2 Bowman probes are passed to the inferior meatus. Four or more days later Number 2 and Number 3 Bowman probes are passed and four days or so later the Number 3 Bowman probe passed again if necessary. The Number 3 Bowman probe should be, with few if any exceptions, the largest size used. Probing may be continued at intervals of four to seven days as long as necessary. A few probings are usually sufficient to effect a cure.

There is an advantage in probing at intervals of four (or more) days over probing under a general anesthetic, using several probes of increasing size at one sitting, the same advantage that exists in adult cases. The reaction from each probing at four day intervals becomes less with successive probings and the lumen of the

passages has greater tendency to remain than after three or four probings at one sitting under an anesthetic.

The Theobold probes are rather sharp pointed and the Bowman probes blunt. The former seem preferable for probing and stretching the tissues of the canaliculus, and the latter for use in the nasal duct of the infant.

SUMMARY

In infants under three or four months of age the lachrymal gland does not function, therefore epiphora is not present in young infants suffering from dacryocystitis. A bead of mucus or muco-purulent material persisting at the inner canthus suggests the disease. Pressure over the lachrymal sac causes muco-purulent material to exude through either the upper or lower punctum or through both.

Probably most cases of simple dacryocystitis in infants are caused by delay in the disappearance of the fetal membrane across the lower end of the nasal duct.

In some cases, cure can be effected by instillations into the conjunctival sac of a weak adrenalin solution followed by a weak silver nitrate solution. Nearly all cases can be cured by probing the lachrymal passages under local anesthesia. Sometimes one probing is sufficient; when more are necessary probings should be at four to seven day intervals. The canaliculus is not slit. The maximum size probe used is the Number 3 Bowman. The time required for a cure is from one to six weeks.

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CASE REPORT

FAR ADVANCED CASE OF HYPERPARATHYROIDISM*

J. L. Tavenner, M.D.
Waseca, Minnesota

All clinicians are aware that the injection of parathyroid extract into the body will produce a rise in the blood calcium content. If this is continued fibrous changes in the bones will be produced as has been shown by Jaffe, Bodansky and Blair.[1] Mandl,[2] in 1926, removed a parathyroid tumor from a patient with osteitis fibrosa cystica, and it was followed by an apparent improvement in the clinical condition.

Since that time others have had similar experiences and the condition has come to be known clinically as hyperparathyroidism. Quick and Hunsberger[3] of Philadelphia reported a far advanced case of hyperparathyroidism in 1931. A parathyroid tumor was removed. This was followed by a return of the blood calcium to normal, and the cystic bones underwent recalcification. Allan and Camp[4] of the Mayo Clinic reported another case recently with a follow-up report of the condition of the patient ten months later showing recalcification of the bones approaching the normal.

The case of hyperparathyroidism I am presenting is in a married white woman, aged 53, whose past medical history included pertussis at sixteen, measles at eighteen, frequent tonsillitis, tonsillectomy at fourty-four, followed a short time later by an attack of herpes zoster.

The family history is negative in that both parents lived to old age and died of natural causes. There were nine brothers and sisters, eight of whom are alive and well. One died in infancy.

The patient began menstruating at twelve and, aside from some irregularity in her teens, there was nothing

*Read before the annual meeting of the Southern Minnesota Medical Association at Rochester, Minnesota, September 12, 1932.

abnormal. The menopause came at forty-nine years of age, corresponding to the time when the present illness was at its height. There were no pregnancies.

This woman weighed 140 pounds when she was twenty-three years old. Her height was 5 feet 9 inches.



Photographs taken in July, 1932, showing the deformities of the extremities. Because of the angle at which the pictures were taken the deformities appear less extensive than they actually are.

She gained weight up to 210 pounds and remained at approximately this figure until some time after the onset of the present illness.

In 1924 this patient complained of frequent nausea and pain in the right shoulder. She was advised to have a cholecystectomy, which she refused. In a month's time the right shoulder became somewhat stiffened. This was followed by pain, limited motion, and stiffness of the right knee and both ankles. Briefly, the apparent arthritic condition spread to the joints of the fingers, and as time went on all of the joints of the body became swollen, painful and stiffened. There were sharp shooting pains in all the long bones. She also complained of pain in the back. A diagnosis of arthritis deformans was made and the patient was further advised to have her gallbladder removed to rid herself of this suspected point of focal infection. The crippling process extended over a period of four years.

In July of 1928 while steadying herself with her left arm in getting around, she experienced a sudden sharp pain in it and was unable to use it. An X-ray plate revealed a fracture of the surgical neck of the humerus together with a marked thinning and cystic appearance of the cortex. This bony change was thought to be due to the marked arthritic involvement of the left shoulder joint. The arm was placed in a sling and healed rapidly. A blood Wassermann test was negative.

The following September the patient sat down a little harder than usual, experienced a sharp pain in the pelvic region and was unable to arise. An X-ray plate revealed a fracture of the inferior ramus of the left ischium together with haziness and irregularity of the bone margins. The patient was placed on a Bradford frame and has never been able to get out of bed since.

From the time that the pelvic fracture occurred until the present time there have been numerous fractures of the arms and legs with great bowing of the shafts of all the long bones.

Upon questioning, the patient tells me that her appetite has been ravenous throughout her illness, and that her thirst has been extreme. Likewise, she has passed large quantities of urine which have always presented a milky appearance until the last six months, when this has not been constant. During the past eighteen months she has suffered numerous attacks of renal colic with the passage of many small calculi. I call attention to these things particularly because these have been outstanding findings in similar cases reported by others. Several examinations of the urine during the summer of 1931 showed specimens containing much inorganic material. This I assumed to be calcium in view of the clinical picture.

Due to the fact that this patient cannot be moved from her home, we have been unable to make further roentgenograms. She refuses venipuncture in her deformed state, fearing that the punctures will never heal. For this reason I was unable to make blood calcium, phosphorus, and phosphatase determinations, which would have been extremely helpful in making a diagnosis. However, it has been shown that we do not have to depend entirely upon these findings to diagnose hyperparathyroidism.

A physical examination made on July 10, 1932, reveals the following:

A moderately obese white female of an apparent age of 55 years presenting grotesque deformities of the entire skeletal system but more especially the long bones. The blood pressure is 110/60, pulse 80 and regular. Temperature 98. Hemoglobin 60 per cent. There are no abnormalities about the head save scanty hair, thinned face, and crumbling teeth. The mandibles are tender, and chewing movements occasion pain at their points of articulation. The neck is thin and markedly shortened.

The thyroid gland is atrophic. On the left side of the trachea in a position corresponding to the posteriomedial aspect of the left lobe of the thyroid gland is a hard smooth mass I would estimate to measure 1.5 by 1 by 1 centimeters. In a similar position in the right side of the neck but at a lower level is a similar mass I would estimate to be 1 by 1 by .5 cm.

The chest resembles a compressed and bulging cage, such that the chin rests nearly upon the sternum.

The heart and lungs present nothing abnormal to percussion or auscultation. However, it is difficult to make a good examination of them with the chest as deformed as it is and since one is unable to move the patient. The abdomen is apparently normal.

The right arm presents a shortened appearance, the

humerus being bowed anteriorly. Both radius and ulna are fractured and bowed anteriorly, and the arm lies motionless at her side.

The left arm can be used but little and has the appearance of the small letter f. The fingers show clubbing and enlarged joints. The phalanges have a thin atrophic appearance.

The lower extremities have not been moved since the pelvic fracture in 1928. The thighs and legs are bowed and drawn up more than the photographs show. They are rotated 90 degrees to the right. Any attempt at passive motion gives the impression that there is no supporting structure left.

In concluding I will say that the following are the points which to my mind classify this clinical entity as a case of hyperparathyroidism:

1. The course of the disease.
2. The loss of inorganic material from the bones, pathological fractures, and the characteristic cystic degeneration of the bones as shown by the X-ray plates.
3. Polydipsia, polyphagia, and polyuria.
4. Continued passage of large amounts of inorganic material in the urine, together with the passage of numerous renal calculi during the height of the disease.
5. Palpable tumor masses in the thyroid gland corresponding to the location of the parathyroid bodies.

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DISCUSSION

Dr. Russell M. Wilder (Rochester, Minn.): This case has all the clinical earmarks of parathyroid overfunction and, although conditions made it impossible for Doctor Tavenner to secure the confirming evidence of laboratory studies, he is to be commended for recognizing the condition and bringing this interesting extreme example of generalized osteitis to our attention. The masses palpated in the neck are probably parathyroid tumors, although without their direct examination it is impossible to exclude adenomata of the thyroid. Multiple tumors have been found in a few cases of this disease, although the rule is for one parathyroid gland alone to be affected. The size of these tumors is quite variable, one reported by Hunter and Turnbull measuring 7.5 centimeters in one diameter and 5 centimeters in another.

A most excellent review of this subject is that of Hunter which appeared last year in the British Journal of Surgery (1931-32, xix, 203). It contains the summary of 32 cases; in 23 of these, parathyroid tumors were removed by operation. We have had five cases here and obtained satisfactory results from operation in four. In the fifth and last case, the patient died seventy-seven days after the removal of a tumor, as a result of gastro-intestinal complications and exhaustion.

The main criteria for the diagnosis of this condition are, first, the accompanying abnormalities in the metabolism of calcium and phosphorus, whereby a negative calcium balance occurs, and second the decalcification of the skeleton with the replacement of bone by connective tissue. The serum calcium is usually elevated several milligrams above the normal value of 9 to 12 milligrams per cent, while the corresponding figure for phosphorus is lower than normal, and the excretion in the urine of both calcium and phosphorus is increased. The experimental reproduction of the disease by Jaffe and Bodansky, mentioned by Doctor Tavenner, has been repeated by my former pupil, J. L. Johnson, who also showed that the condition was unrelated to osteomalacia. It is also to be distinguished sharply from osteitis deformans (Paget's disease). The roentgenographs of the skeleton in Paget's disease bear a superficial resemblance to those of hyperparathyroidism, but differ in many particulars, as is especially noticeable in the shafts of the long bones. The bone cortex is usually thickened in Paget's disease, in contrast to the narrowed cortex of the bones in the fibrous osteitis of hyperparathyroidism. There is nothing abnormal in the calcium concentrations of the blood and urine in Paget's disease, no abnormalities are found in the parathyroid glands and parathyroidectomy is without benefit.

MAHLON W. LOCKE

This physician in the little village of Williamsburg, Ontario, occupies the stage as the Miracle Man of 1932. His stunt consists, as his enthusiastic proponents have declared, of "toe-twisting," and his specialty is what the public vaguely call rheumatism. Dr. Locke has been in the miracle-man business for at least two or three years, and in spite of the fact that it is claimed that he has developed a technic that brings him tens of thousands of patients annually, he has not seen fit to tell any other physicians about it; medical literature contains not a single article by him, so far as a careful search has been able to determine. Dr. Locke's publicity has been through the newspapers and magazines, the present interest being due to an article "The Pain-Killer," by Rex Beach in Hearst's International-Cosmopolitan for August, 1932. There seems to be a subsidiary industry in connection with Dr. Locke's manipulations—a shoe factory. Just what manipulation Dr. Locke gives is not clear, as he has not seen fit to pass on his magic formula to the medical profession. There is evidence to the effect that Dr. Locke manipulates the first metatarsal, internal cuneiform and scaphoid (navicular), with the thumb of one hand against the head of the scaphoid and the other hand holding the first metatarsal. By the law of averages, it is inevitable that a man treating tens of thousands of patients by manipulation and in the psychologic atmosphere inseparable from such a shrine, must persuade many that they have been benefited. In such large groups there must be many psychoneurotics whose inhibitions are lifted by the combined manipulations and psychic reactions of the surrounding circumstances, and who may testify that they have been cured. (Jour. A. M. A., November 19, 1932, p. 1798.)

President's Letter

IT was to be expected, in this year of unrest and of economic upheavals, that much legislation of a subversive nature would be introduced into the state Legislature.

Details of some of these legislative proposals have been sent to all members of the State Association by the Chairman of the Committee on Public Policy and Legislation.

As you will note in your letter on the subject, several formidable assaults have been made on the Basic Science Law. They were veiled and almost inoffensive at first glance. In the case of the Naturopathic Bill, in particular, however, proponents had organized a surprisingly strong and adroit attack, an attack that should prompt every physician in Minnesota to reflect upon the importance to him and to the public of the Basic Science Law that now stands upon our statute books.

The fight that Dr. Herman Johnson and his committee have waged and are waging to protect the public and decent medical legislation, and to prevent any entering wedge for the quack and cultist racket is the personal fight of every physician, both as a professional man and as an intelligent, responsible, public-spirited citizen.

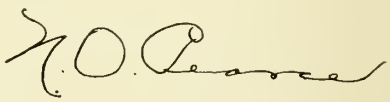
Anything that any one of us can do in a private and individual capacity to help the fight along is not only a good but a necessary thing to do.

Some fifty bills having some bearing upon medical or hospital practice have reached committee hearings this session, Dr. Johnson estimates. Most of these, owing to the prompt action of the committee, never got beyond the hearings. Many remain that are likely to require constant watching up to the moment of adjournment.

The national economic emergency, involving an imperative necessity for cutting federal expenses, will undoubtedly operate for some time to limit the aspirations of bureaucrats desiring to extend federal participation in medical and public health matters.

The burden of watchfulness, this year, rests upon legislative representatives of the state medical bodies. The stern need for economy rests more lightly upon state legislators, perhaps, than upon the federal government. Legislators are more than usually likely to be stampeded into hasty, ill considered action, and the State Association may be proud, to date, of the work of its committee in keeping the state clean of destructive legislation.

Incidentally, it is time to make plans to attend the State Meeting at Rochester, May 22, 23, and 24. This is to be a distinguished meeting at a unique meeting place. Every advantage of Rochester facilities will be taken by the Committee on Scientific Assembly. Don't miss it!



President,
Minnesota State Medical Association.

EDITORIAL

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THERAPY OF AGRANULOCYTIC ANGINA (MALIGNANT NEUTROPENIA)

Since the first report by Schultz in 1922, the literature concerning agranulocytic angina has increased tremendously each year. Various other names have been suggested for the syndrome, such as malignant neutropenia, agranulocytosis, granulocytopenia and idiopathic neutropenia. Some writers doubt that it is a separate disease entity, but only a rare manifestation of some obscure infection. Jackson[1, 2] and his collaborators use "agranulocytic angina" to mean lowering of the granulocytes without known etiology and accompanied by angina or ulceration of the mouth and soft tissues. "Malignant neutropenia" they use to indicate lowering of the granulocytes following some known septic process in the body.

In the earlier years of the experience with this condition very few patients recovered, and in some quarters recovery was thought to invalidate the diagnosis. In more recent years, however, many proven cases have recovered and their recovery has been attributed to a multitude of therapeutic agents. Chief among these in value have been X-ray of the long bones, blood transfusions, arsphenamine, and liver extract. In 1931, Taussig and Schnoebelen[5] reviewed the literature and found reports on 328 collected cases of malignant neutropenia which had varying forms of therapy. Of those treated by X-ray 47 per cent recovered. Blood transfusions were credited with 36 per cent recoveries and arsphenamine with 27 per cent. Of 178 cases in which miscellaneous treatment was used, 25 per cent recovered.

Some years ago experimental work demonstrated the presence in normal human blood of pentose nucleotides, substances which are derived chiefly from the nuclei of living cells. Also, nucleic acid and some of its derivatives have been shown to stimulate white blood cell formation. Reznikoff,[4] using intravenous injection of purine salts derived from nucleotides, in 1930 reported three cases of agranulocytic angina with recovery. This form of therapy has been extensively developed in the past two years by Jackson and his associates[1, 2] at Harvard University, and a nucleotide committee has been formed at that institution for carrying on further studies. In their last report,[2] sixty-nine cases have been treated, with fifty-one (74 per cent) recoveries. The name "Nucleotide K96" under which the nucleotide preparation was first commercially prepared (Smith, Kline and French Co.) was later changed, at the suggestion of the Council on Pharmacy and Chemistry of the A. M. A.[3] to "Pentnucleotide." This product is a compound of several nucleotides containing a purine or pyrimidine base and pentose and phosphoric acid.

The nucleotide is usually used in amounts of 0.7 gm. of the solid dissolved in 10 c.c. of distilled water and injected intramuscularly twice daily till the white count begins to rise; then once daily till the count has been normal for three consecutive days. If relapses occur, this therapy is resumed. In several of the reported cases, patients have had multiple recurrences of the condition, each successfully combated with nucleotide therapy. In very sick patients the same dose may be given intravenously in 100 c.c. volume of normal saline daily for four days, with added intramuscular doses. Only mild reactions occur after in-

tramuscular injection (nausea, dyspnea and mild precordial distress), but more severe reactions follow intravenous dosage and the latter route should be avoided in the face of myocardial weakness.

The authors state that very low white counts, complete absence of polymorphonuclear neutrophils, and very high temperatures do not materially affect the prognosis when this therapy is used. Improvement begins almost always on the fifth day, and the constancy of this latent period they feel indicates the efficacy of the product. In several of their cases, as the white count rose, localized pus collections formed due to the increasing numbers of polymorphonuclears thrown into the circulation to combat the infection. The white count and differential count are usually normal by the tenth day of treatment.

Obviously, there still will be a few acute fulminating cases of neutropenia, usually with some overwhelming systemic infection, which will die in the five-day latent period before the nucleotide can be effective. However, the reports on this new therapeutic agent are most encouraging and it is hoped that they will be confirmed by the experience of the profession at large, which only too often has been baffled in every attempt to save the lives of these patients.

J. Allen Wilson.

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FREE MEDICAL CARE

The present crowding of hospitals and dispensaries where the profession renders service gratis only serves to bring into the limelight the whole subject of who should and who should not be given free professional service. It is to be hoped that the present economic upheaval will result in a more fair adjustment of a responsibility which is at present a tremendous burden on the profession.

Perhaps Mencken* is right when he says that the medical profession has allowed itself to be imposed upon by the extension of free medical service to more than the indigent.

With the establishment of hospitals and dispensaries for the care of the indigent, which after all is an outgrowth of Christian civilization, the medical profession was willing as a group to render free professional service as a contribution to local charity. The comparatively recent extension of care by such institutions to patients not strictly penniless but able to pay something to hospital or dispensary has been a departure from the original idea. The group of patients receiving free professional service has thus been enlarged due doubtless to the easy-going attitude of the profession.

Perhaps Mencken is right when he says: "There is, as a matter of fact, no plausible reason for arguing, as uplifters always do, that the privilege of first-rate medical care is a right that every free-born American acquires at birth, regardless of his merits or his means."

As far as medical service is concerned there seems to have developed three classes of patients, as pointed out by Dr. A. F. Branton in an article which appears in this number of Minnesota Medicine. There is the class that is self sufficient in every way including medical care; a class that is dependent on charity for everything—medical care included; and a third class that seems to be self-supporting except for medical care. Should this third class be recognized?

In normal times only a small percentage of the population can be classed as indigent. Now, of course, most of the unemployed have been added to the group. The vast majority of the population belong to the comparatively small income group, which constitutes the main clientele of the medical profession. It is only when a prolonged or serious illness or disability is experienced by individuals in this group that the cost is unbearable, and this occurs in a comparatively small percentage of this large group. It is this small percentage that under such unfortunate circumstances might be termed indigent as far as medical service alone is concerned. Here then is the main argument for sickness insurance for those with small incomes.

How should such sickness insurance be provided? It is being written to some extent at the present time with cash benefits provided in case of sickness. This assists the beneficiary to meet the expense of private care. It does not cover the complete costs of sickness, nor should it. To do so would only place a premium on slow convalescence. Insurance to cover all the costs of complete medical, dental, hospital and nursing care, it has been shown, would be too expensive from an insurance standpoint, too open to abuse, and simply too idealistic.

The medical profession in general approves of sickness insurance which enables the sick individ-

*Editorial. *The American Mercury*, March, 1933.

ual to provide for his own private care. It unalterably opposes all proposals whereby the insurance company provides medical care through physicians employed by them. This virtually amounts to insurance companies entering the practice of medicine.

Perhaps, too, Mencken is right in accusing the medical profession of not offering enough resistance to the evil tendency of medical care to become more and more expensive, and especially hospital care.

Certain it is that the cost of medical care has increased considerably in recent years. Part of this increase has been the necessary accompaniment of scientific advance. Extravagance has been in evidence, however, not only in the uncontrolled construction of hospitals that were not needed, but in the construction of hospitals fit for kings rather than individuals with modest incomes. Some patients simply add to the cost of hospital care by demanding needless luxuries in the way of hospital accommodations and nursing care. The profession, too, has been to some extent to blame in their insistence on the need of hospital care when it has not been necessary. All this needless adding to the cost of sickness simply increases the number of those who cannot meet the expense of private medical care.

There are certain very definite indications for a correction of present trends in medical practice. If the present economic debacle by serving to accentuate these evils results in their correction it shall have served a useful purpose.

The profession fought seemingly in vain against the inexcusable extension of Veteran hospital care to include non-service disabilities. It seems as though the crisis will likely correct this unwarranted invasion of private practice and limit hospital care to service cases and possibly also to the indigent ex-soldier.

Medical and nursing schools have been turning out graduates in excess of actual needs. The depression has brought this to the fore and concerted action should be taken to reduce enrollments.

Another evil which should be aired as a result of the times is the extension of benefit associations to provide medical and hospital care to those outside the association. This extension results in underbidding of private hospitals and physicians at the expense of members of such benefit associations.

Retrenchment in the use of hospitals, from the standpoint of construction, equipment and utilization, is in order.

And finally, the limitation of free medical care furnished by city, county and state institutions to the indigent alone, whether the doctors in attendance are paid or not, should be strictly adhered to.

GREETING OF THE MEDICAL PROFESSION OF THE NORTHWEST TO DR. J. W. BELL OF MINNEAPOLIS ON HIS EIGHTIETH BIRTHDAY

On March 18, 1933, his eightieth birthday, the doctors of the Northwest, and especially those of Minneapolis and St. Paul, sent greetings to Dr. John W. Bell, honored and beloved member of the medical profession; honored because of his knowledge, his skill and his experience, and beloved because of his gentleness, his charity and his uprightness.

During his long career of fifty-two years of active practice in Minneapolis he has ever been an outstanding figure in the profession. In 1888 he began his career as a teacher when he became a member of a small medical school which later developed into the medical school of the University of Minnesota Medical College, and he has been a professor on its faculty until he retired, only recently, with the title of Emeritus Professor of Clinical Medicine and Physical Diagnosis.

He has always been a student and has sought always to increase his scientific knowledge by visits to the outstanding clinics both abroad and in this country; and this knowledge, gained both by study and from his own experience, he has freely passed along by his teaching and his writings.

Besides his private practice he has served many years on the staff of the University Hospital, the Northwestern Hospital and the Minneapolis General Hospital.

He has been honored by election to the presidency of the Minnesota State Medical Association, the Hennepin County Medical Society and the Minnesota Academy of Medicine. Only a year ago he retired from practice, and is now enjoying a well-earned and merited rest.

On this occasion, dear Dr. Bell, the doctors of the Northwest, many of them your old students and all of them beholden to you for inspiration and for valuable medical information, greet you and wish you many happy returns of the day.

H. B. S.

SAINT PAUL HOSPITAL SERVICE PLAN MISREPRESENTED

On March 18, 1933, the newspapers in the Twin Cities gave some publicity to the Hospital Service plan which is being put into effect in St. Paul. Some of the articles did not give a correct presentation of the plan, the outline of which was given our readers in an editorial in the December, 1932, issue of the Journal, to which those interested are referred.

As a result of this newspaper publicity there has been some misunderstanding in medical as well as lay circles.

In the first place this proposition of applying

insurance to cover hospital service was planned before the final report of the Committee on the Costs of Medical Care appeared and is in no way an outgrowth of that report. The doctors in Saint Paul had nothing to do with initiating the service, which is a child of the Saint Paul hospital superintendents and trustees, adopted from other localities where it was reported to have been successful. The Ramsey County Medical Society discussed the proposal at some length and took no action, as the opinion was expressed that the undertaking affected hospitals only, and if properly run should not affect the relation of patient and doctor.

One point which seems to have been omitted in the newspaper articles is that the hospital service is limited to Ramsey County citizens and eight Saint Paul hospitals. The physician's fee is not covered by the insurance. All that is provided in the contract is hospital care.

Incidentally, neither the Ramsey County Medical Society nor any other component society in the Minnesota State Medical Association, so far as we know, has endorsed the Majority Report of the Committee on the Costs of Medical Care.

OF GENERAL INTEREST

Dr. Fred A. Erb, Minneapolis, was chosen president of the Hennepin County Tuberculosis Association at the annual meeting held the latter part of February.

Dr. J. T. Bowers has disposed of his interests in the Physicians Hospital, Thief River Falls, Minnesota, to Dr. A. W. Swedenburg. Dr. Bowers is now located in Bemidji, Minnesota.

Through the organization, March 1, of the Hospital Service Association in Saint Paul, with a membership of eight Saint Paul hospitals, the group hospitalization plan has become a reality in that city.

The Winona General Hospital will receive the bulk of the $200,000 estate of the late John Dietze of Winona. Mr. Dietze had been president of the hospital board since 1920 and a member of the board since 1912.

The Shrine Hospital for Crippled Children in Minneapolis was recently bequeathed $10,000 in the will of the late Edward A. Gowran. The bequest was made for the purpose of constructing a convalescent addition at the hospital. An additional $500 was bequeathed to the hospital for summer outings for child patients.

Dr. A. C. Strachauer left for New York on March 2, to attend the semi-annual meeting of the Board of Directors of the American Society for the Control of Cancer. After the meeting, Dr. and Mrs. Strachauer will vacation in Florida previous' to taking a West Indies cruise and will return by way of Mexico City. Dr. and Mrs. Strachauer will return this month.

Assignment to the international iceberg patrol, said to be one of the loneliest and most dangerous assignments given any sailor, has been given Dr. Kenneth Gamm of Saint Paul, a graduate of the University of Minnesota medical school, 1931. Dr. Gamm has been assistant chief surgeon at the Marine Hospital in Baltimore for the past eight months, and sailed about March 15 on the Coast Guard cutter Mendota to begin his new work. The assignment continues as long as the huge masses of ice in the Atlantic break off and float southward to menace shipping and ocean liners.

On the invitation of the Chicago Regional Fracture Committee of the American College of Surgeons the Minneapolis and St. Paul Fracture Committees were invited to spend the day in Chicago on February 25, 1933. Excellent clinics given by Dr. Kellogg Speed were enjoyed at the Presbyterian Hospital in the morning, and clinics given at the Cook County Hospital by Doctor Cubbins in the afternoon and at the Billings Hospital by Doctor Phemister in the afternoon.

The Chicago committee acted as host, serving an excellent luncheon and ending the day with a dinner at the University Club.

The following men from Minneapolis attended: Kenneth Bulkley, Richard R. Cranmer, Daniel A. MacDonald, Ivar Sivertsen, Owen H. Wangensteen, Roscoe C. Webb, Willard White, Otto W. Yoerg, and Arthur A. Zierold.

The office of the Secretary of the Minnesota State Medical Association has frequently in the past received letters from medical men requesting information concerning certain collection agencies to which they have already turned over their accounts. Recently the Secretary's office has again received a large number of this type of letter.

From time to time there appears in MINNESOTA MEDICINE a caution to members of the State Association urging them to write the Secretary's office for information concerning unknown collection agencies. The State of Minnesota requires a $5,000 bond to be posted by such agencies with the Secretary of State, but investigations show that most of them do not do this.

Members of the State Association are again warned to investigate *before* they turn their accounts over to unknown agencies.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

ST. PAUL ELECTROPATH PLEADS GUILTY

State of Minnesota *vs.* Victor J. Zettel

On March 3, 1933, Victor J. Zettel, Shubert Building, St. Paul, entered a plea of guilty to practicing healing without a Basic Science Certificate before the Honorable Richard D. O'Brien, Judge of the District Court. The defendant has no license to practice healing in any of its forms in the State of Minnesota. He was arrested following the treatment of a St. Paul man for varicose veins and ulcers. The patient claimed that the defendant guaranteed to cure him in eight treatments by the use of light rays. The patient became worse instead of better and finally was taken to the Ancker Hospital where he was treated by licensed and reputable physicians.

Judge O'Brien sentenced the defendant to six months in the St. Paul Workhouse and suspended the sentence for one year. The defendant was placed in the custody of the Probation Officer and Zettel was warned by Judge O'Brien as follows:

1. That the defendant close his office in the Shubert Building immediately.
2. That the defendant remove all listings from the building directory, telephone directory and city directory, and in any other place where he holds himself out to the public as being engaged in the practice of healing.
3. The defendant was warned by the Court to absolutely refrain from practicing healing directly or indirectly and he is not to attempt to practice in the office of either his father or his brother.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

The Archbishop Looks at Medicine

When a medical man talks of the dangers of State or Insurance Medicine, he lays himself open to a suspicion, on the part of the critical, of self interest.

When a distinguished clergyman, whose interest in medicine, as in all departments of life, is purely humanitarian, also sees a danger to the comman man in State Medicine, then the medical man may surely take heart.

On Wednesday, March 15, 1933, John Gregory Murray, Archbishop of the Diocese of St. Paul, addressed the Ramsey County Medical Society at a noonday luncheon. Following is a report by a society member of the Archbishop's talk.

"The theme," says this member, "dealt specifically with the ideals of the three professions, Ministry, the Law, and Medicine, particularly Medicine. In the course of the talk, the Archbishop developed the historical background of these professions as arising out of the unit of the family. He brought out the interesting fact that in the early days of the human race, the father of the family functioned as priest, law-giver, and physician.

"He traced the development of medicine through the days of Æsculapius, Hippocrates, and Galen, showing how these three labored to rid scientific medicine of mysticism, superstition and quackery.

"Through their efforts and the efforts of their successors were evolved the ideals of the profession. Distinguishing between the workman and the professional man, the Archbishop pointed out that the workman is paid his hire on the basis of the work done, whereas the professional man is tendered an honorarium on the basis of the service he is able to render. The professional man chooses to be a professional man because of the good he can do rather than because of the fees or the salary he may receive.

"The climax of the talk was an impressive appeal to the medical profession to exert all of its power and influence toward prevention of State or Insurance Medicine. State Medicine or any related system would place the medical man on the basis of a salaried worker, he said, and moral and intellectual stagnation would be the result.

"No personal interest prompted the Archbishop to his plea, as he pointed out. His interest in the matter lay in the behalf of the welfare of humanity at large and the good of the members of the medical profession."

Archbishop Murray will speak at the 80th Annual Meeting of the Minnesota State Medical Association at Rochester on Tuesday night, May 23.

Another Volume

Publication No. 22 of the Committee on the Costs of Medical Care is a volume of 302 pages entitled "The Fundamentals of Good Medical Care." According to its authors, Roger I. Lee, M.D., Lewis Webster Jones, Ph.D., and Barbara Jones, it is an attempt to give definite meaning to the words, "adequate, scientific medical service" in the oft-quoted pronouncement of Olin West, Secretary of the American Medical Association, that ". . . . the outstanding problem before the medical profession today is that involved in the delivery of adequate, scientific medical service to all the people, rich and poor, at a cost which can be reasonably met by them in their respective stations in life."

This work is unique as an estimation of needs for medical and dental care and of minimum time and equipment involved in supplying those needs. It is, furthermore, an interesting example of the more or less anomalous position in which the backers of the Committee on the Costs of Medical Care find themselves. On the one hand, exhaustive studies published in its name stress the importance of the independent, responsible family physician. On the other hand, the majority advocates experiments in quasi-state medicine which representatives of the physicians themselves—the organized medical profession—declare will endanger, if not actually destroy, the independent family physician.

Note the following excerpt from "Fundamentals of Good Medical Care" in its introductory chapter entitled "Scope of the Study":

"Good medical care maintains a close and continuing personal relation between physician and patient. The complex nature of the human being, the intricate relationships between body and mind and between the parts and the whole, establish long familiarity with the patient's personality and habits as the first essential in good medical care. The family physician is the person best qualified to supervise the health of members of the family, to diagnose their illnesses and to treat them or to direct their treatment. No amount of technical skill, no combination of mechanical or laboratory devices, is as useful in the diagnosis of many conditions as a personal knowledge of the patient's medical history, family situation and general mental and physical idiosyncrasies. . . . ."

OBITUARY

George Christian Wellner
1857-1933

Dr. George Christian Wellner, eighty-four, for many years active in the medical profession since coming to Minnesota in 1875, died Friday evening, March 3, 1933, of pneumonia at his home in Minneapolis.

Born in Bavaria, Germany, he came to the United States in 1857, settling in Wisconsin before moving to Chicago in 1862. He received his education in the parochial schools of Germany, in the public schools of the United States, and attended a private academy and the Rush Medical College.

Dr. Wellner moved to Red Wing, Minn., in 1875, later practicing at Springfield and Wabasha. He was married to Margaret Hickman of Red Wing in 1878.

In addition to his private practice, Dr. Wellner was active in many organizations of the medical profession and held a number of public offices before his retirement.

During his residence in the state he served as county physician of Brown County, member of the common council and board of education at Springfield, county physician of Wabasha County and health officer of Wabasha, and was president of the Wabasha County Medical Society.

Dr. Wellner later was president of the Goodhue County Medical Society, president of the Red Wing board of health, and director of the third district Minnesota Association for the Relief and Prevention of Tuberculosis. He was a member of the Minnesota State and the American Medical Associations.

Dr. Wellner is survived by his widow and two daughters, Mrs. Robert A. Haeussler and Mrs. Joseph J. Fassbinder.

John E. Dewar
1871-1933

Dr. John E. Dewar, sixty-two, of Minneapolis, said to be one of three medical men in this country who are members of the Royal College of Physicians and Surgeons of England, died Wednesday, March 15, 1933.

Dr. Dewar was born in Glengarry, Ont., Canada, and was a graduate of McGill university in Canada, later taking courses in Edinburgh and London in the British Isles, where he became a member of the Royal College organization. He came to Minneapolis in 1896. In the World war he served in the English medical service. He was unmarried.

Surviving him are two sisters, Mrs. Anna Campbell and Mrs. Elizabeth Rogers, both of Slocan, British Columbia. Dr. Dewar was a member of the Hennepin County Medical Society, the Minnesota State and American Medical Associations.

ADEX TABLETS

The Council on Pharmacy and Chemistry found Squibb Adex Tablets not acceptable for New and Nonofficial Remedies. The implications referred to in an advertisement in the *Parent's Magazine* for September are definitely misleading. The Council has declared there is no evidence to show that Vitamin A will prevent any of the respiratory diseases mentioned in the advertisement. It would appear that E. R. Squibb & Sons is advertising the accepted product cod liver oil to the profession with conservative claims and that Adex Tablets are being advertised to the public with claims that are not countenanced by conservative medical opinion. (Jour. A. M. A., November 12, 1932, p. 1712.)

MISCELLANEOUS

SOME MODIFICATIONS IN THE APPARATUS FOR CONTINUOUS NASAL DUODENAL SUCTION

Chas. H. McKenzie, M.D., L.M.C.C.
Minneapolis

The use of continuous nasal suction drainage for preoperative decompression of intestinal obstruction cases, and for postoperative relief of vomiting and distension, is undoubtedly one of the most valuable advances in surgical treatment.



Fig. 1. Nasal suction apparatus with modifications in use on patient. Note Y-tube.

The apparatus has been described and cases have been reported by Wangensteen, Benjamin, et al. This article will describe modifications of the original apparatus, which have proven of value.

We have found that the duodenal tube easily becomes plugged with mucus, food particles, etc., and requires cleaning frequently with water, bicarbonate of soda solution or air. To do so it is necessary to clamp off the tube leading to the upper bottle, disconnect the duodenal tube, and connect the syringe containing the solution to be injected into the duodenal tube. After the injection the process is reversed. In this process, bile-stained liquid almost invariably is spilled on the bed linen, necessitating change of linen, and the fre-

quent moving of a seriously ill patient. Occasionally also, one may wish to inject medication via the duodenal tube and the same spill is observed.

Modification No. 1.—To obviate the necessity of disconnecting the tubing and the subsequent change of linen and moving of patient, a Y-tube is inserted in the

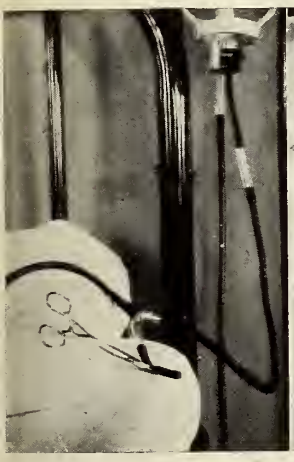


Fig. 2.



Fig. 3.

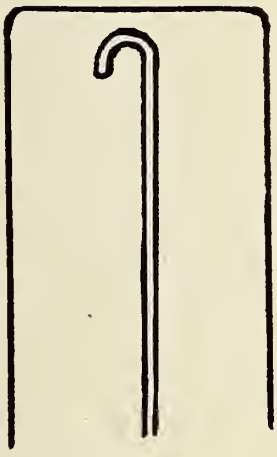


Fig. 4.

tube leading to the upper bottle. A short piece of tubing is attached to one arm. This piece is clamped (Fig. 1). When it becomes necessary to flush the duodenal tube, a 100 c.c. bulb syringe containing the desired solution is attached, the clamp changed to the upper arm and the solution injected. The process is then reversed and once more the apparatus works freely. The illustrations show this quite clearly. Figure 2 shows the suction in operation. Figure 3 shows nurse ready to inject water to flush out the duodenal tube, the tube leading to the upper bottle having been clamped off. If medicine has been injected, both arms of the Y-tube are clamped off temporarily.

Modification No. 2.—It has been found rather difficult to notice the fluid as it discharges slowly over the end of the straight tube in the upper bottle. In order that the discharge of the stomach and duodenal contents into the upper bottle may be observed more easily, the end of the long tube in the upper bottle may be turned downwards, so that it discharges like a spout. One can then see at a glance whether or not the apparatus is working satisfactorily (Fig. 4).

The cleaning of the tubing and bottles is rather distasteful but if one allows one or two gallons of hot or cold bicarbonate of soda solution (2 to 5 per cent) to siphon through the apparatus immediately after use, it is easily cleaned.

The tubing in the stomach and duodenum loses its firmness and collapses in twelve to twenty-four hours, necessitating the insertion of new tubing. We have found it much less expensive to buy ⅛ inch tubing in bulk to make up new tubes using the plummet again and again after sterilizing.

REFERENCES

1. Wangensteen, Owen H.: Western Jour. Surg., Obst. and Gyn., 40:1 (Jan.), 1932.
2. Benjamin, Arthur E.: Minn. Med., 15:8, 534 (August), 1932.
3. Wangensteen, O. H., and Paine, J. R.: Minn. Med., 16:96 (Feb.), 1933.

SECRETARIES GRAPPLE

Your secretary herewith reports the activities of the Annual Secretaries' Conference held in St. Paul on February 18. Under the able and efficient management of Dr. Meyerding, who presided, many weighty and vexing problems which beset the medical fraternity were presented and discussed. It is hardly to the discredit of the meeting that the answer to it all somehow escaped solution.

The question of state dues received considerable attention. Dr. Savage of St. Paul, one of the state councillors, outlined the activities and the accomplishments of the State Society and explained the budget requirements for 1933. While this budget includes some economies, it does not contemplate a reduction of the present dues. In spite of this convincing recital and the assurance that vital activities could not be maintained on less income, a very determined effort was made by the representatives of two county societies to swing the sentiment of the meeting toward a reduction. The debate became rather noisy and bitter, but the overwhelming sentiment as expressed by speeches and ballot seemed to be that while the society as a whole would welcome the assurance of its officers that its dues could be reduced without harm to its important activities, since that assurance was not forthcoming and most obviously could not be given, state dues should be maintained as they are. As expressed by one member—if the present and contemplated activities of the State Society cost two or three times as much as they have they would still be worth it.

Having safely passed this hurdle, the meeting next viewed with horror the growing incidence of malpractice suits and the imminent danger of a rise of insurance rates. Legal representatives from various companies outlined the causes. Greater activity on the part of hungry attorneys explains the increased incidence, and growing resentment of the average juror toward any organization with money explains the larger verdicts. For the most part, malpractice suits grow out of careless or vindictive comments made by physicians themselves about the work of others. It was suggested that the Golden Rule might be applied here, for without the assistance of physicians no malpractice suit could be successfully prosecuted. Physicians were warned never to belittle the work of a fellow practitioner in the presence of the patient.

Dr. Hengstler of St. Paul, chairman of the State Committee on Medico-legal Affairs, recommended a standing medical defense committee in each county society. He also brought up the lack of uniformity in the practice of charging for expert testimony in defense of malpractice suits. It was recommended that the State Society take some action to standardize and regulate the fees.

The various methods of caring for the indigent by county societies were discussed. Dr. Theodore Sweet-

ser outlined the various plans now contemplated or in operation. Dr. Collins of Duluth described a program practically adopted in St. Louis County whereby a lump sum was paid to the county society. This was prorated to the members contributing the service on the basis of the number of calls or office consultations rendered. Mr. George B. Larson, secretary of the Polk County Medical Society of Wisconsin, described a plan which has been in operation for some time. In this admittedly successful scheme, the members contribute the service and the lump sum received from the county carries on the activities of the society and pays the state dues. It was pointed out that no one plan meets the requirements of all counties and that each county society must study its own peculiar problem and model its system accordingly.

Of such value did the members of this society regard the present radio broadcasts sponsored by the state society that Dr. Wm. A. O'Brien in his usual lucid and fluent style told how to build interesting and worthwhile society programs. The text of his theme was that the subject was more important than the man and should be chosen first, after which the best fitted speaker could be secured.

The afternoon conference was devoted to a consideration of the effect of workmen's compensation on medical practice and to some of the 1933 legislative problems. A representative of one of the large insurance companies handling compensation insurance presented the insurance side of the controversy, while Dr. C. B. Wright and Dr. J. M. Hynes presented the physicians' point of view. It was pointed out that whereas the law specifies that the employer shall choose the doctor for the injured employee a recent decision of the supreme court has overthrown this and upheld the right of the patient to choose his own medical attendant. A definite inclination to coöperate seems manifest on the part of insurance companies. It is here observed, with a note of skepticism, that unless the per injury cost to the insurance company as now operated can be met or approximated under a system of complete freedom of choice of physicians, coöperation will never progress to an agreement. There are, however, encouraging signs and if members will measure up to the promises of their arbiters the present unsatisfactory situation may be ironed out.

Dr. Herman Johnson discussed some of the bills to be presented to the 1933 legislature which have a direct effect on medical practice. There was the usual chiropractors' effort to get out from under the basic science law. The naturopaths surprised everyone by securing the services of ex-Judge of the Supreme Court Hallam to represent them. Dr. Johnson urged everyone to communicate immediately with their representatives in an effort to offset the considerable influence of Judge Hallam.

Two bills which should be strongly supported were the drivers license bill which practically forces all car owners to carry insurance and the hospital lien bill which will give a hospital a legal claim on any settlement made between an insurance company and the plaintiff. As the situation now stands the companies settle and the plaintiff forgets to pay the hospital.

Whereas we have already disclaimed any responsibility for having failed to dispose of any momentous question, the meeting was eminently worth while in promoting an understanding of the other fellow's problem and in developing a united front as an organized society. The growing threats to the continued enjoyment of the practice of medicine call for a unity of effort greater than ever before achieved. The relative youthfulness of the majority of the secretaries and the keen interest shown in economic matters suggest that these matters will continue to receive attention.

O. J. Campbell, M.D., in
Hennepin County Bulletin, March 10, 1933.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of April will be as follows:

April 5—Low Blood Pressure.
April 12—When the Baby Cries.
April 19—Family Jaundice.
April 25—Cancer of the Rectum.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The American Association for the Study of Goiter will hold its annual meeting at Memphis, Tennessee, May 15 to 17 inclusive. The morning sessions will be devoted to hospital clinics and the afternoons to addresses on various phases of the goiter problem.

The presidential address by Dr. Henry S. Plummer of Rochester, Minnesota, is scheduled for the evening session the first day, and the annual banquet the second day of the meeting.

Physicians in good standing are cordially invited to attend the meeting and to join the special group sailing from New York, July 26, to attend the International Goiter Conference to be held in Berne, Switzerland, August 10 to 12. Special rates have been provided and daily programs arranged while en route to Le Havre. Those interested should communicate with Dr. J. R. Yung, corresponding secretary, Terre Haute, Indiana.

AMERICAN CONGRESS OF PHYSICAL THERAPY

The Mid-Western Section of the American Congress of Physical Therapy will conduct a one day scientific program on Monday, May 15, 1933, at the Hotel Jefferson, Peoria, Illinois. This immediately precedes the annual meeting of the Illinois State Medical Society which commences on May 16. A splendid program has been arranged. The medical profession is cordially invited. There will be no registration fee.

STATE MEDICAL MEETING

A unique program has been arranged by the Committee on Scientific Assembly for the 80th Annual Meeting of the State Association scheduled for Rochester, May 22, 23, and 24, 1933.

This program brings the general practitioner and his needs into central focus, according to the Committee. At the same time, it will demonstrate, in its scientific exhibits and in its small group demonstrations, an unexampled variety of new scientific processes and novelties. All of the remarkable facilities available at Rochester will be utilized in the course of the three days' sessions.

A principal feature will be a full afternoon of clinics of wider variety and interest, according to committee

members, than any similar section ever arranged for a state meeting.

Special programs will be presented by the following societies of specialists: Surgery, Orthopedics, Neurology, Pediatrics, Ophthalmology and Otolaryngology, Heart, Trudeau, Radiology, and the Department of Obstetrics and Gynecology, University of Minnesota. These programs, together with the table demonstrations, will occupy the whole of Monday.

The radiotherapy and physiotherapy demonstration under the direction of A. U. Desjardins, Rochester, is expected to attract especial interest, since the scope of this demonstration is practically without precedent at any medical meeting.

A symposium on Emergency Surgery has been arranged to take account of all of the commoner surgical emergencies confronting the general practitioner. Farm, automobile, and industrial accident, emergency surgery of the abdomen, emergency surgery in infants and children, and strangulated hernia are among the subjects.

A timely symposium on Nutritional Disorders is also to be a headliner on the scientific program. Skin, eye, and systemic manifestations of avitaminosis, treatment of malnutrition in adults, and vitamin deficiency in children, will be covered by this symposium.

The Scientific Cinema will be shown at specified hours on Tuesday and Wednesday. Among the films of unusual interest are "Repair of Hernia with Living Suture," J. C. Masson, Rochester; "Gait in Nervous Disease," J. C. McKinley, Minneapolis.

Tuesday afternoon's clinics will be conducted by Dean Lewis of Baltimore, President of the American Medical Association; E. S. Judd, Rochester; H. L. Kretschmer, Chicago; Irvine McQuarrie, Minneapolis; A. W. Adson, Rochester, and F. J. Hirschboeck, Duluth.

Distinguished guest speakers for the meeting will include, besides Dr. Lewis and Dr. Kretschmer, James Ewing of New York, Philip C. Jeans of Iowa City, and Walter Simpson of Dayton, Ohio. Dr. Lewis will conduct a clinic on Fractures. Dr. Ewing will talk on Malignancy on Wednesday. Dr. Kretschmer will conduct a clinic on urology. Dr. Jeans will talk on Vitamin Deficiency in Children in the course of the Symposium on Nutritional Disorders scheduled for Tuesday. Dr. Simpson will talk on Undulant Fever on Tuesday also. Dr. J. H. Peck, Des Moines, President of the National Tuberculosis Association, will talk on Control of Tuberculosis: National and International on the Trudeau Society program, Monday.

Two evening meetings, Monday and Tuesday nights, will bring a group of famous speakers together to talk over medical economics, social and scientific problems of the medical profession.

On Monday night Morris Fishbein, Chicago, will talk about the "Depression and Costs of Medical Care" with discussion by C. H. Mayo of Rochester, and other important speakers still to be announced.

Dean Lewis, and Olin West, Chicago, Secretary of the American Medical Association, and N. O. Pearce, president of the State Society, will speak Tuesday night. W. J. Mayo, Rochester, will preside at this meeting.

A golf tournament, fraternity luncheons, and other social events have been arranged to complete the social program of the meeting, some of which will include doctors' wives, and members of the Women's Auxiliary to the State body, who will hold their annual meeting at Rochester also during the three days of the medical meeting.

Many special social events for the women are being arranged by the Auxiliary to the Olmsted-Houston-Fillmore County Medical Society.

MINNEAPOLIS SURGICAL SOCIETY

At the annual election of officers of the Minneapolis Surgical Society Dr. Kenneth Bulkley was re-elected president; Dr. Martin Nordland, vice president, and Dr. F. A. Olson, secretary-treasurer. Dr. A. A. Zierold was elected to serve on the Council for a five year term to replace Dr. E. C. Robitshek. The Council now consists of the officers and Dr. O. H. Wangensteen, Dr. J. M. Hayes, Dr. E. A. Regnier, Dr. R. C. Webb, and Dr. A. A. Zierold.

The following program has been arranged for the next meeting of the Society to be held in the Todd Amphitheater of the University Hospital, Thursday, April 6, 1933, at 8 P. M.

1. Drs. Harry P. Ritchie, Carl M. Waldron and N. Logan Leven:
   Presentation of a group of plastic cases
2. Dr. William T. Peyton:
   Some remarks on carcinoma of the rectum and other types of malignancy
3. Drs. Arthur T. Bratrud and Frank S. McKinney:
   The injection method in the treatment of hernia
4. Dr. Melville H. Manson:
   Amputations for diabetic gangrene
5. Dr. C. Donald Creevy:
   Transurethral resection of the prostate
6. Dr. O. Samuel Randall and Clayton Beecham:
   The clinical aspects of benign tumors of the stomach
   Discussion by Dr. Leo G. Rigler
7. Dr. Charles H. Mead:
   The prevention of excoriation of the skin in intestinal fistula with the use of yeast as a dressing
8. Dr. Owen H. Wangensteen:
   Some unusual surgical conditions of the duodenum

WOMAN'S AUXILIARY

WOMAN'S AUXILIARY*

to the

AMERICAN MEDICAL ASSOCIATION

Eleventh Annual Meeting
Milwaukee

June 12-16, 1933

Headquarters: Hotel Pfister, Milwaukee, Wisconsin

PRELIMINARY PROGRAM

Monday, June 12, 1933

12:30 P. M. Luncheon at College Woman's Club in Honor of Past President, followed by National Board Meeting and visit to American Medical Association Exhibits at Auditorium. Tickets $1.00

7:00 P. M. Dinner for National Board, Delegates, and wives of Officers and Delegates of the

*All women attending this Convention, whether Auxiliary Members or not, are invited to participate in this entire program.

American Medical Association at Woman's Club of Wisconsin. Musical program furnished by artist members of Auxiliary to Medical Society of Milwaukee County. Tickets $1.25

Tuesday, June 13, 1933

9:00 A. M. General Meeting, Roof Room, Hotel Pfister, Mrs. James F. Percy, *Presiding.*

12:30 P. M. Luncheon and Bridge at the Wisconsin Club.
Tickets $1.25

2:00 P. M. †Attractions available for those not wishing to play bridge are Layton Art Gallery, Milwaukee Art Institute, Milwaukee Museum, Curative Work Shop and Vocational School.

or

†Bus Trip to County Institutions, Milwaukee Children's Hospital Convalescent Home, and Washington Park Zoo.

8:00 P. M. General Meeting of American Medical Association.

10:00 P. M. Informal Dance at Wisconsin Club.
Courtesy of State Medical Society of Wisconsin.
Hostesses: Woman's Auxiliary to the State Medical Society of Wisconsin.

Wednesday, June 14, 1933

9:00 A. M. General Meeting, Roof Room, Hotel Pfister, Mrs. James F. Percy, *Presiding.*

12:30 P. M. Auxiliary Luncheon, Fern Room, Hotel Pfister.
Guests and Speakers from the American Medical Association.
Musical Program.
Tickets $1.00

4:00 P. M. †Teas in private residences.

8:30 P. M. Light Opera.
Tickets $1.00.

Thursday, June 15, 1933

9:00 A. M. General Meeting, Roof Room, Hotel Pfister, Mrs. James Blake, *Presiding.*

12:00 Noon Trip to Oconomowoc Lake District. Luncheon 12:30 P. M., Carnation Milk Plant, Oconomowoc, Wisconsin. Transportation and Luncheon Courtesy of Carnation Milk Company.

or

12:30 P. M. Buffet Luncheon, Crystal Room, Hotel Pfister.
Tickets 75c.

2:00 P. M. †Sightseeing Tour of Milwaukee.

6:30 P. M. "Bring Your Husband" Dinner. Fern Room, Hotel Pfister.
International-House-Cabaret.
Tickets $1.50

9:00 P. M. President's Reception and Ball, Schroeder Hotel. Hosts: The American Medical Association.

Friday, June 16, 1933

10:00 A. M. Golf Tournament,
All trips start from Hotel Pfister.

Mrs. Rock Sleyster, *General Chairman,*
Wauwatosa, Wisconsin.

†Bus transportation to be paid by individuals.

PROCEEDINGS MINNESOTA ACADEMY OF MEDICINE

Meeting of January 11, 1933

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town & Country Club on Wednesday evening, January 11, 1933. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the president, Dr. C. D. Freeman. There were forty-nine members and two guests present.

The business meeting was omitted and the scientific meeting consisted of the retiring president's address.

THE STATUS OF OBSTETRIC PRACTICE IN MINNESOTA

Dr. J. C. Litzenberg (Minneapolis), the retiring president, gave an address on the above subject. Numerous lantern slides of charts were shown. (To appear in May number of Minnesota Medicine.)

Discussions were given by Drs. R. E. Scammon, E. C. Hartley and Hobart Johnson (by invitation), and by Dr. Litzenberg. (Discussions to appear with the paper.)

The meeting adjourned.

Meeting of February 8, 1933

The regular monthly meeting of the Minnesota Academy of Medicine was held on Wednesday evening, February 8, 1933, at the Town & Country Club. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the president, Dr. C. D. Freeman. There were thirty-two members and two visitors present.

Minutes of the December and January meetings were read and approved.

A motion was carried that Dr. John W. Bell, of Minneapolis, a past president of the Academy, be made an Honorary Member.

THE NEW SURGERY OF BLADDER NECK OBSTRUCTION

INSTRUMENTS, METHODS, AND REVIEW OF CASES

Dr. F. E. B. Foley (St. Paul) read a paper with the above title, illustrated with lantern slides. (See page 240.)

Discussions by Drs. Braasch, P. F. Donohue (St. Paul) and C. D. Creevy (U. of M.) (by invitation), and Drs. C. B. Wright and Foley. (Appear with paper.)

Owing to the lateness of the hour, Dr. W. H. Condit's paper on "Trichomonas Vaginalis" was postponed to the next meeting.

The meeting adjourned.

R. T. La Vake, M.D., *Secretary.*

IODIZED SALT, AND GOITER AN IODINE DEFICIENCY DISEASE

Iodine, an essential chemical element for normal nutrition, may be insufficiently furnished by food and drink and cause simple goiter, an iodine deficiency disease. Although supplemental iodine supplied through salt or other special foods may prevent goiter that would otherwise occur or cure incipient cases, the simple administration of iodine in this manner is not a "cure all." An "accepted" iodized salt shall contain one part of sodium or potassium iodide for each 5,000 parts of salt (approximately 150 parts of iodine per million parts of salt), or the iodine equivalent of any other suitable iodine compound. Iodized salt containing more than this quantity is considered a medicament not to be advertised to the public for table and cooking uses. (Jour. A. M. A., November 12, 1932, p. 1691.)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD JANUARY 5, 1933

The President, Dr. Kenneth Bulkley, in the Chair

Dr. O. H. Wangensteen (U. of M.) made a brief report upon the meeting of the Western Surgical Association, which was held at Madison, Wisconsin, on December 9 and 10, 1932.

PYLORIC STENOSIS IN A MALE 67 YEARS OF AGE, WITH A CLINICAL PICTURE OF PROGRESSIVE PERNICIOUS ANEMIA

Dr. J. M. Hayes reported the following case: The patient is a male, 67 years of age. His family history was essentially negative. His personal history was negative up to about one year before Dr. Hayes saw him, which was on March 17, 1931.

He had gradually lost weight and strength for one year. When first seen he was able to get out of bed with considerable difficulty. He had lost thirty-seven pounds in weight in the past year. His appetite had gradually decreased until by this time he made little attempt to take food of any kind. He complained very little of distress of any kind but had occasional attacks of explosive vomiting. He was taken to the hospital at once and laboratory studies were made. The blood showed: Hemoglobin 45 per cent; red blood cells 1,980,000; white blood cells, 5,600; neutrophiles 69 per cent, lymphocytes 28 per cent, monocytes 3 per cent; anisocytosis marked, poikilocytosis marked, polychromatophilia moderate. The urine was negative. An Ewald test meal was given and 30 c.c. of undigested material aspirated. The total acidity was 100, with no free hydrochloric acid present. There were no palpable masses in the abdomen, nor any marked tenderness. The X-ray showed filling defect at the pyloric end of the stomach, suggesting a new growth in this area. There was a 30 per cent retention after five hours.

A clinical diagnosis of pernicious anemia was made, also a pyloric obstruction possibly due to a malignant growth. Syphilis was also considered because of this pyloric obstruction with no palpable mass. No other findings or laboratory tests pointed to a diagnosis of syphilis, however.

The high degree of obstruction made surgery imperative. On April 11, 1931, under local and ethylene anesthesia, the stomach was explored after first giving the patient 500 c.c. of citrated blood. The pyloric end of the stomach was hard and gave the appearance of hypertrophied muscle. About one and one-half inches from the pylorus on the lesser curvature was a hard mass about 3 c.c. in diameter and somewhat elongated. At operation Dr. Hayes said they hesitated considerably as to whether to do a gostroenterostomy or a partial gastric resection. The stomach was easily mobilized and, considering the age of the patient, it was thought the probability of a malignancy was very much to be considered, consequently a Polya type of resection was done. Another transfusion of 500 c.c. of blood was given after the operation.

On April 18—seven days after the resection—the blood showed: hemoglobin 75 per cent, and red blood cells 3,480,000. On April 19th the administration of liver extract was begun. On April 27th the hemoglobin was 83 per cent and the red cells 4,100,000. Until this past month he had not received treatment for one year. His hemoglobin again went down to 60 per cent but came back after the administration of liver extract.

The patient was presented. He appears to be in good health and has no particular trouble at the present time. The X-ray picture shows the resected stomach as it now appears.

NEUROFIBROMA OF THE ULNAR NERVE (TWO CASES)

Drs. G. R. Dunn and A. S. Hamilton (by invitation) reported two cases, as follows:

Dr. Dunn said this patient came in with a lump on the medial side of the left arm near the axilla. The lump was unattached, rather freely movable within slight range, and with no sensory or motor disturbance. In September, 1931, he was advised that he have it removed. At operation the tumor was found associated with the ulnar nerve, and four definite strands of the nerve could be seen passing around the tumor. The tumor was removed, and Dr. Hamilton will give you the gross and microscopic findings. In regard to the incidence of these tumors, Dr. Dunn said they are not very common, and one must always take into consideration the fact that later on other tumors may show up in the patient.

Dr. A. S. Hamilton (by invitation) discussed the clinical features and gross and microscopic findings in Dr. Dunn's case. Dr. Hamilton had seen the patient only as he was being operated. The tumor obviously was in the ulnar nerve region and over the tumor mass were four strands of nerve fibers. Dr. Hamilton said that five or ten years ago he would have considered this an easy matter to discuss, but apparently the idea that this is a connective tissue tumor is an error, and more recently it has been called a Schwannoma.

When this particular tumor was removed it revealed a mass about two-thirds the size of the distal joint of the thumb with four bundles of nerve fibers running around it (specimen shown). On the outside is connective tissue and inside this is the tumor composed of a reddish gray material, not particularly firm. The tumor shows a peculiar structure, not like connective tissue microscopically, but what has been called "palisade" structure. In sectioning, if one happens to cut vertically or transversely, the structure gives a varied appearance, but, as it usually is cut, it has the peculiar appearance of one layer on top of another, or the so-called "palisade" structure.

Dr. Hamilton said the first tumor of this sort he remembered seeing was in 1919, in a Captain in the Army Engineering Corps. In June, 1918, the Captain was squeezed by some horses but he was not seriously hurt and there was no local lump, special soreness or numbness. One month later he had shooting pains in the third and fourth fingers of the right hand and about three months later a lump appeared on the inside of the right upper arm and continued to grow until operated June 20, 1919. At this latter time he had no sensory disturbance on the back of either hand but on the palmar surface of the right hand there was a decided sensory change. There was a condition of striking hyperalgesia on the palmar surface of the right ulnar area and in the same region 4° C. was quickly felt as "colder."

Pressure on the tumor caused sharp darting pain on the palmar surface of the ulnar distribution and, if the pain were once started, it would last more or less all day. The patient had agreed to have the operation without anesthesia if he could bear it and Dr. Hamilton had expected to use the Bristow coil to test the difference nerve bundles and to learn, if possible, the distribution and function of each, but the apparatus directly broke down and Dr. Hamilton had always felt that he lost an opportunity in this case to make a real contribution to peripheral nerve surgery.

The patient lived in Texas and Dr. Hamilton heard from him about one year after the operation but the symptoms were then those of an ordinary complete ulnar lesion.

Dr. Bulkley asked what the tumor would do if not operated upon.

Dr. Hamilton said he had seen a good many neurofibromata or multiple tumors. These may increase in size and may also atrophy and even more or less disappear, but the case reported this evening was a different sort of tumor than the ordinary neurofibroma. Dr. Hamilton said he did not know what it would do if not removed but he would assume that it would keep on growing. Some one asked about stripping the tumor from the nerve, but Dr. Hamilton said there were five bundles passing over the tumor and one through it in the second case, and in the first case reported this evening (Dr. Dunn's) there were four bundles around the tumor, and Dr. Hamilton thought it would have been impossible to take the tumor out without injury to the nerve bundles in either case.

Dr. Dunn stated that this patient gave no history of injury, trauma, or any other provocative cause so far as he could determine.

CESAREAN SECTION FROM THE STANDPOINT OF THE GENERAL SURGEON

Dr. Gilbert Cottam read a paper with the above title. (To be published separately.)

DISCUSSIONS

Dr. O. W. Yoerg said that general surgeons, as a rule, do not perform cesarean operations very often, but stated that he would like to report a case. The woman weighed 278 pounds. Dr. Yoerg happened to be out of town on a court case and was asked by one of the local doctors to see the patient. The woman had an enormous pendulous abdomen with an abdominal wall only about half an inch thick, however. She had been in labor for thirty-six hours. There was no dilatation of the cervix, and with each pain the uterus was thrown forward in the herniated abdomen, so that the cervix pointed directly upward instead of towards the vaginal outlet. He thought, however, no difficulty would be encountered if the abdomen were bandaged with a sheet. This was done a number of times, using as many as three sheets folded up about the abdomen. With each pain the sheets were torn, and it was finally decided that a cesarean operation would be necessary. A live baby was obtained and the patient made a good recovery. About a year later a second cesarean section was done on this patient by Dr. Yoerg, again successfully. In doing the second operation the incision was accidentally made across the fundus of the uterus, but was closed in the usual manner and without any complications.

Dr. E. K. Green felt that this able paper of Dr. Cottam should not go by without comment. In the city, where gynecologists can be so easily called in consultation, the general surgeon does not have the opportunity to often perform a cesarean section. He wished to make the point that many men in general practice would give their patients better service if they would coöperate with the general surgeon and in this work let the man who is familiar with abdominal surgery do the work and take the responsibility. While it is a line of surgery that lends itself easily to abuse, there is no question about its value in a selected class of cases, *i.e.*, placenta previa, eclampsia, and contracted pelvis, as in his last case of a midget which was reported at the Hennepin County Medical Society meeting recently.

Dr. A. S. Hamilton (by invitation) said he was not a surgeon but he thought he could report the first cesarean operation in Minnesota. It was about 1870 at a point thirty-five miles west of Minneapolis. A farmer's wife was passing through the barnyard and was attacked by a vicious young cow. The woman's abdomen and uterus were ripped open and the child was delivered on the spot. Incredible as it may seem, the mother and child recovered. For the accuracy of this statement, one may refer to the records of the Minnesota State Medical Society.

Dr. M. J. Lynch said in the summer of 1918 he was engaged to take care of a woman who was to be confined, when he received orders to report to Camp Taylor. He so informed the patient and suggested that she get some good man to take care of her. Dr. Lynch said he was to leave on a 10 o'clock train and shortly before that the husband of this woman called him and said he would have to see Dr. Lynch. The husband stated that that afternoon they had been to the office of a general surgeon and he was told that his wife would have to have a cesarean section the next morning. Dr. Lynch was somewhat surprised and suggested that they get in touch with a man who is a rather well known obstetrician here in the city. About ten days later, Dr. Lynch said he received a letter from this obstetrician informing him that the patient was all right and had delivered herself about three hours after the onset of labor.

Dr. F. J. Schatz (St. Cloud) (by invitation) said he wondered if all the cesarean sections that are being done are justified. The following case was cited as an illustration.

Mrs. G. P., para six, aged 32, was seen in his office in December, 1930, when five months pregnant. In her five former pregnancies she was delivered in her home. Her last menstrual period was June 15, 1930. She was as large as a patient would be at eight months' gestation; fetal heart tones could not be heard, and, on palpation, one could not outline the fetus due to the large amount of fluid (polyhydramnios).

In January, 1931, the patient received an injury by falling, and, on account of size and discomfort, she went to her family physician in a nearby town, who referred her to another physician. Because of the size and labored breathing, he advised hospitalization. She consulted a third physician and he sent her to the hospital January 10, 1931. The next day the attending physician passed a trocar through the anterior abdominal wall into the uterus and withdrew 2,700 c.c. of amniotic fluid. The patient obtained temporary relief but as the fluid recurred the patient was unable to lie down and had to sleep in a sitting position. Her weight at this time was 155 pounds, temperature 98.1°, pulse 96, respirations 20, blood pressure 124/65, red blood cells 3,600,000, white blood cells 6,800, and hemoglobin 58 per cent. On January 15, 1931, a classical cesarean section was performed under local infiltration and nitrous oxide. The one child was edematous and died within an hour, and the second child lived twenty-four hours. The combined weight of the two children was 3,000 grams.

Dr. Schatz said that in studying the literature one finds the tendency is to more conservatism and fewer cesarean sections in certain metropolitan areas, while in others the employment of the operation includes every imaginable complication of labor and pregnancy.

Dr. Schatz said he was doing a limited amount of general medicine with his obstetrical and pediatric practice. In over 3,200 deliveries he has had but two cases in which section was done. Both were primiparæ. In the one the membranes ruptured spontaneously with a complete prolapse of the cord; the patient was not in labor. In the other, there was a general contracted pelvis. The patient was in labor for forty-eight hours under the care of a midwife, with complete dilatation of the cervix and a floating head.

Dr. Schatz believes that many of the cesareans are elective on the part of the attendant, and the patients were not given a fair test of labor. He felt that the future health and ability of a parturient woman to deliver through the normal passage should be considered before deciding for or against cesarean section. He said he has delivered primiparæ of all ages up to

forty-three years, with all types of presentations, and complicating multiple uterine fibroids and placenta previa. He could not give exactly his intrapartum fetal deaths, but he had had less than ten.

Dr. Schatz said that because he is greatly interested in this subject, he attended this meeting to hear the reports given.

Dr. Cottam (in closing) said that in approaching this subject he had been actuated by his own experience covering a number of years wherein he had been placed in the position of consultant in a number of cases such as he had described, where a very serious emergency existed and prompt decision and action were necessary. Cesarean section is an easy and relatively safe operation in the hands of a competent general surgeon, but the risk is greatly increased where there has been undue delay, repeated examinations, and attempts at delivery. It goes without saying that each case must be determined on its merits and in no case should the operation ever be done merely because it is an easy and quick solution of a slow problem. The indications must be clear and unmistakable.

F. A. Olson, M.D., *Secretary.*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

BOOKS RECEIVED FOR REVIEW

The Ætiology of Tuberculosis. Robert Koch, M.D. Translated from the German of the original paper read in Berlin March 24, 1882. Introduction by Dr. Allen K. Krause. 48 pages. Illus. New York: National Tuberculosis Association, 1922.

Thirtieth Annual Report of the Bureau of Science —Philippine Islands. William H. Brown, Director of the Bureau of Science. 94 pages. Manila, Bureau of Printing, 1932.

The Technique of Contraception. Eric M. Matsner, M.D. Published for the American Birth Control League, Inc. 38 pages. Illus. Price, 50c, paper cover. Baltimore: The Williams & Wilkins Company, 1933.

Diseases of the Heart. Sir Thomas Lewis. Physician in Charge of Department of Clinical Research, University College Hospital, London, etc. 297 pages. Illus. Price, $3.50, cloth. New York: The Macmillan Company, 1933.

Case Studies in the Psychopathology of Crime. Ben Karpman, M.D. 1,026 pages. Illus. Price, $12.00, cloth. Washington, D. C.: Mimeoform Press, 1933.

ELECTROTHERAPY AND ELEMENTS OF LIGHT THERAPY. Richard Kovacs, M.D. 528 pages. Illus. Price $6.50. Philadelphia: Lea and Febiger, 1932.

This book has been a very pleasing one to read as the information contained in it is given in a very understandable manner and scientific terms are carefully explained. The subject of electrophysics is covered thoroughly and without producing any sense of confusion in the mind of the reader. The author's discussion of electrotherapy and electrodiagnosis shows him to have an open mind and his claims for various procedures are not too extravagantly made. The section on light therapy is indeed a very excellent one, describing in detail the photothermal radiations, photochemical radiations and their clinical uses.

Ample illustrations showing apparatus in use, diagrams of various electrical instruments and the direction of passage of current through the body as well as a number of graphs aid in the ease with which the book can be read.

We highly recommend this publication to anyone interested in the electro- and heliotherapy.

George A. Williamson, M.D.

MODERN GENERAL ANESTHESIA. A Practical Handbook. James G. Poe, M.D., Lecturer on General Anesthesia in the Medical and Dental Departments of Baylor University. Second edition, completely revised and enlarged. Illus. 231 pages. Price $2.50. Philadelphia: F. A. Davis Company, 1932.

In a commendably small compass are given the phenomena attending the administration of the general anesthetics, showing the signs and symptoms of the various stages of intoxication produced, with well placed emphasis upon the possible danger signals, and directions for avoiding or meeting accidents as they occur. No words are wasted; what is said is all to the point, with nothing of value left unsaid.

There is also a description of the non-volatile anesthetics—avertin, sodium amytal, and pernocton—and their use preliminary to the general anesthetics, but local anesthesia the author touches upon but lightly for the reason that it "is at present performed by the surgeon and requires extensive special training together with anatomical knowledge as given in special treatises on the subject."

There is a special chapter on anesthesia in obstetrics with favor shown to nitrous oxide-oxygen analgesia combined with ethylene for deeper narcosis, preceded by sodium amytal or pernocton hypnosis. Where nitrous oxide is not available ether is advised. The use of chloroform is discouraged even in obstetrics.

The preface states that "the history of anesthetics and the manufacture and chemistry of agents are omitted." This should have been very well had it been adhered to, but ether is introduced by the statement that it "was discovered by Valerius Cordus in 1540, and was first used as an anesthetic in 1842 by Dr. Crawford W. Long of Georgia," and that is all that is said about it. Likewise all that is said of nitrous oxide gas is that "it was discovered by Priestly in 1772, and first used with oxygen for general anesthesia by Dr. E. Andrews in 1868." Shades of Horace Wells and W. T. G. Morton, that a book should be written about anesthesia without mentioning the names of you who gave to the world this greatest of all boons ever conferred upon the human race!

W. Davis, M.D.

DISEASES OF THE HEART: Described for Practitioners and Students. Sir Thomas Lewis, Department of Clinical Research, University College Hospital, London: Medical Research Council, etc. 297 pages. Illus. Cloth. Price $3.50. New York: The MacMillan Company, 1933.

This new book on diseases of the heart is more than just another book. It is a volume with a new and different approach to a most important subject. In this book the well known clinician and author of books and articles on the heart and blood vessels tells us that his intent in writing the book is to "stimulate intelligent interest in phenomena not of the laboratory . . . but of everyday practices." He emphasizes that "in managing our patients our thoughts must be chiefly set in terms of function and not of structure." He admits that he has departed from past precedents. "The book," he tells us, "differs much in its arrangement and in its outline from other books dealing with affections of the

heart; but that is perhaps the soundest reason for its publication."

The author's intention is beautifully carried out. He has weeded out unessential details and has given due emphasis to the current physiological, pathological and therapeutic concepts. Dr. Lewis has shown himself to be an adept in helping the reader visualize the many intricate problems of heart disease and its treatment.

The first and second chapters take up the bases of symptoms of cardiac failure with and without venous congestion. An important chapter deals with the cause, treatment and diagnosis of failure with congestion. This chapter, like the first, though brief, gives a comprehensive and balanced discussion not often found in writings of this kind. Dr. Lewis shows remarkable self-restraint when he deals with his pet subject, the graphic registration of the heart beats by means of the electrocardiogram and polygram. Graphic tracings are judiciously used only to illustrate the various abnormalities in the heart action and rhythm whenever such tracings may demonstrate any deviations from the normal. In the chapter on subacute bacterial endocarditis, he emphasizes that the patients are best treated at home where they may have frequent cheerful visitors. Since the prognosis is practically hopeless, the restrictions on these patients must not be too great. He advises against loading up these patients with remedies, since these often cause more harm than good. Throughout the book there is evidence of the importance of treating the patient as well as the disease. The advice given is always sound and is undoubtedly the result of extensive personal clinical experience in contrast to simple résumés of opinion obtained from other authors as is so frequently found in textbooks. The main subdivisions of the subject are treated in short chapters of not more than fourteen pages each. The excellent balance in the distribution of space is well shown by the fact that only five pages are allotted to the discussion of congenital heart disease.

This book makes a fine acquisition to the medical literature and it comprises a rare combination of clarity, brevity and authoritativeness, yet it is replete with invaluable hints and suggestions for cardiac management. The reviewer feels that he cannot recommend too highly this new volume on the heart to practitioners and students alike, realizing of course that because of the brevity of the volume certain rare conditions and extensive details have necessarily been omitted.

Moses Barron, M.D.

CHILDREN'S TONSILS IN OR OUT: A CRITICAL STUDY OF THE END-RESULTS OF TONSILLECTOMY. Albert D. Kaiser. 307 pages. Illus., diagram, charts. Price: $5.50. Philadelphia: J. B. Lippincott Co., 1932.

This book, written by Dr. Kaiser and others connected with the University of Rochester Medical School, is based on facts obtained by observation of a large group of children over ten years of time. It brings out that tonsillectomy will do certain things and will not do others, just as most of us have suspected, without having such a mass of statistics as proof. For instance, tonsillectomy does not prevent recurrences of laryngitis, bronchitis, asthma or head colds, but does help chronic otitis media, repeated tonsillitis, cervical adenitis, rheumatic fever, diphtheria carriers, recurrent pyelitis, anorexia (unexplained) and cyclic vomiting.

The book gives a complete list of indications for tonsillectomy as well as contra-indications, and discusses the hazards of operation as well as the dangers of incomplete operation. It touches on radiation of tonsils and electrosurgery and concludes that in children these methods are not preferable to surgical tonsillectomy.

The book should be read by all interested in the subject of tonsillectomy and will correct many abuses. It is just a little late, however, as the height of the craze for removal of tonsils has passed.

Kenneth A. Phelps, M.D.

LIST OF PHYSICIANS LICENSED BY THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS, FEBRUARY 7, 1933

(January Examination)

NAME	SCHOOL OF GRADUATION	ADDRESS
Addington, Ercell Adelbert	U. of Minn., M.B., 1931; M.D., 1932	St. Croix Falls, Wis.
Brock, William George	U. of Manitoba, M.D., 1930	619 4th St. S.W., Rochester, Minn.
Butsch, Winfield Louis	U. of Buffalo, M.D., 1930	Mayo Clinic, Rochester, Minn.
De Lien, Horace	U. of Minn., M.B., 1932	Fairview Hospital, Minneapolis, Minn.
Gianturco, Cesare	U. of Naples, Italy, 1927	Mayo Clinic, Rochester, Minn.
Ginsberg, Stewart Theo	U. of Minn., M.B., 1932	St. Mary's Hospital, Duluth, Minn.
Herbst, Richard Fred	U. of Minn., M.B., 1932	St. Mary's Hospital, Minneapolis, Minn.
Ingels, Arne Ely	U. of Oslo, Norway, 1922	Mayo Clinic, Rochester, Minn.
Judd, Walter Henry	U. of Nebr., M.D., 1923	Mayo Clinic, Rochester, Minn.
Loken, Theodore	U. of Nebr., M.D., 1932	Fairview Hospital, Minneapolis, Minn.
Porcher, William J. L.	U. of Minn., M.B., 1932	Detroit Receiving Hospital, Detroit, Mich.
Seashore, Rosel Theo	U. of Minn., M.B., 1932	Miller Hospital, St. Paul, Minn.
Steffens, Lincoln Felch	U. of Minn., M.B., 1932	St. Mary's Hospital, Duluth, Minn.
Tanglin, Walter Geo. Ludwig	U. of Minn., M.B., 1931; M.D., 1932	Mahnomen, Minn.
Tomlinson, Harry Coleman	Washington U., M.D., 1931	4250 W. Broadway, Robbinsdale, Minn.
Troost, Henry Bradley	U. of Minn., M.B., 1929; M.D., 1932	Mankato, Minn.
Wallace, Martin Olmsted	U. of Minn., M.B., 1932	St. Mary's Hospital, Duluth, Minn.
Wingquist, Carl Gustave	U. of Minn., M.B. and M.D., 1932	693 York St., St. Paul, Minn.

BY RECIPROCITY

Steube, Ronald Walter	U. of Buffalo, M.D., 1931	Alexandria, Minn.

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XVI MAY, 1933 No. 5

THE STATUS OF OBSTETRIC PRACTICE IN MINNESOTA*

JENNINGS C. LITZENBERG, M.D.
Minneapolis

THIS study was stimulated by a desire to determine how the practice of obstetrics in Minnesota fitted two conclusions of the White House Conference on Child and Maternal Welfare, called by President Hoover in 1930 and 1931.

After the Conference President Hoover promulgated the "Children's Charter" of nineteen articles, one of which was: "For every child full preparation for his birth, his mother receiving prenatal, natal and postnatal care, and the establishment of such protective measures as will make childbearing safer." There never has been such a thorough study of child and maternal welfare problems before this Conference. The fact findings and conclusions are authoritative. A few of them by the Maternal Welfare Committee will suffice to epitomize the conclusions:

1. "The United States lags behind the civilized world in the prevention of maternal mortality, three-fourths of which are due to controllable causes, for example, infection, toxemia and obstetric hemorrhages."

2. "The welfare of the mother and her offspring can only be secured by better obstetrics, and furthermore, to accomplish this, there must be better teaching of obstetrics." To us teachers this was striking close home.

3. "In 1929, in the birth registration area (all but two states) there were approximately 15,000 maternal deaths, 80,000 deaths of infants less than one month old, and 85,000 stillbirths, 65,000 of which were due to injury at birth.

4. "It is apparent that most undergraduates do not receive sufficient practical clinical training." (There were 3,600 deliveries in 1932 in the four teaching hospitals, staffed by University teachers: Minneapolis General, University, Ancker, and Salvation Army hospitals.)

5. "There are unavoidable hazards to both mother and child, but these can be minimized by adequate teaching and practice of prenatal, natal and postnatal care, all consecutive and complete."

6. "If only our present day knowledge were universally and skillfully applied, many thousands of lives could be saved annually and much suffering and injury avoided."

Measured by this exacting yard stick, where does Minnesota stand?

I confess that it was with no little trepidation that this study was undertaken for I felt that if the teaching of obstetrics, at the University, has been adequate, it should be reflected in the statistics, because the graduates from the Medical School constitute about one-half of the physicians of the state.

For this study the reports of the United States Census Bureau (the last complete one being for 1929), and the reports of the Minnesota State Board of Health have been used for comparing Minnesota with the U. S. registration area and certain foreign countries.

Before making these comparisons I have thought it pertinent to discuss birth rates.

BIRTH RATES

Birth rates, the world over, have been steadily decreasing since 1915, as is graphically shown in Figure 1, which illustrates the comparative birth curves of the U. S. registration area, Minnesota, and various European countries. In the U. S. registration area, the rate decreased from 25.1 births per 1,000 population, in 1915, to 18.9 in 1929, a drop of 25.5 per cent or more than 2 per cent a year. The Minnesota rate fell 26 per cent. Had the rate remained at its highest point, 24.7

*Address of the retiring president of the Minnesota Academy of Medicine, January 11, 1933.

in 1915, the number of births in Minnesota, in 1929, would have been 63,000 instead of 46,713, a difference of more than 16,000 babies. In 1929, the excess of births over deaths was 21,021.

esting to note also, that similar decreases are recorded in Europe: Denmark 5.6, Norway 6.1, Sweden 6.4, Italy 5.3, British Isles 7.1 and Germany 2.5 (Fig. 1).

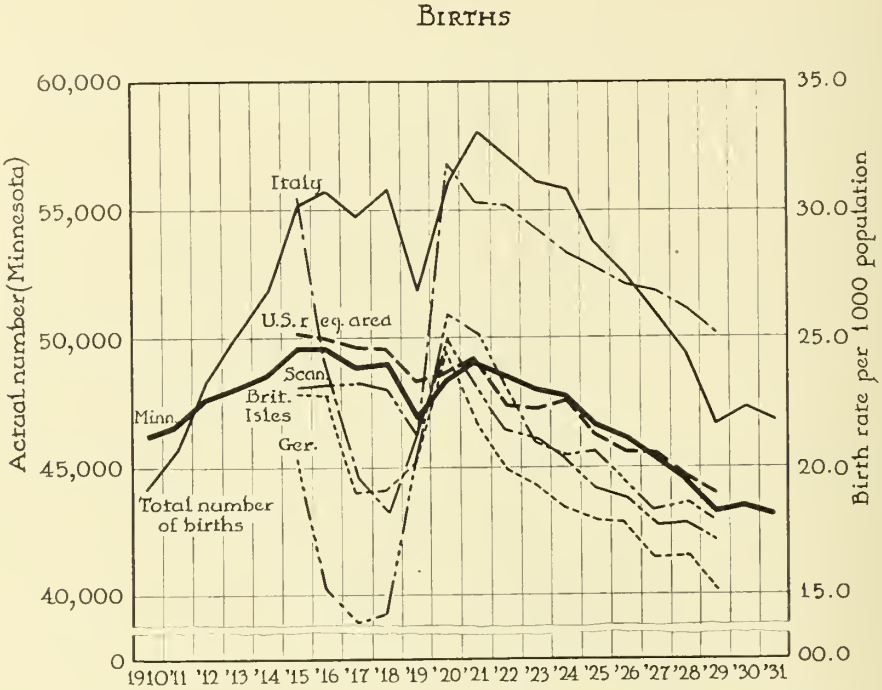


Fig. 1. Comparative birth rates of Minnesota, the U. S. registration area and certain foreign countries. The heavy black line indicates the birth rate, and the lighter black line the total number of births in Minnesota.

However, if the rate continues to decline and the total death rate remains as stable as it has for two decades, it will not be long until births equal deaths, a condition not to be contemplated with entire equanimity. It is generally estimated that when the birth rate reaches 10 per 1,000 population, or 1 per cent, then the births and deaths will be equal. This will certainly be true in this state, where the death rate has remained from 9.5 to 11 deaths per 1,000 population for twenty years.

Inasmuch as the Minnesota birth rate has remained about the same for the three years, 1929, 1930 and 1931, it may be hoped the birth rate will become stabilized before it reaches ten per 1,000 population. That similar factors are responsible for the falling birth rate throughout the country, is attested by the fact that the decrease in the birth rate in the registration area of the United States was 6.2 per 10,000 population, compared to 6.4 in Minnesota. It is inter-

MATERNAL MORTALITY

It is often contended that because the classifications of deaths from puerperal causes differ greatly, a comparison of foreign statistics with those of the United States is impossible and unfair to this country. Methods of classifications in each country, however, change but little, therefore comparisons of increases or decreases from year to year are quite equitable. The maternal mortality rate for the U. S. registration area (all but two states) was seven per 1,000 live births, according to the Census Bureau reports for 1929 (the latest complete figures).

The Minnesota rate, 4.3 maternal deaths per 1,000 live births, is 38.8 per cent below that of the country at large. The high U. S. rate is chiefly due to the black population of the South, with a rate of twelve deaths per 1,000 live births. Excluding the negroes, the rate is 6.3. The Minnesota rate of 4.3 still shows a rate 31.7 per

cent lower than the average for the white population of the United States.

Consulting Figure 2 it will be seen that the Minnesota rate has decreased rapidly since 1920, per cent higher than the Minnesota rate of 4.3 per 1,000 live births, although for the last decade it has a consistently lower rate.

Figure 3 graphically illustrates the story of

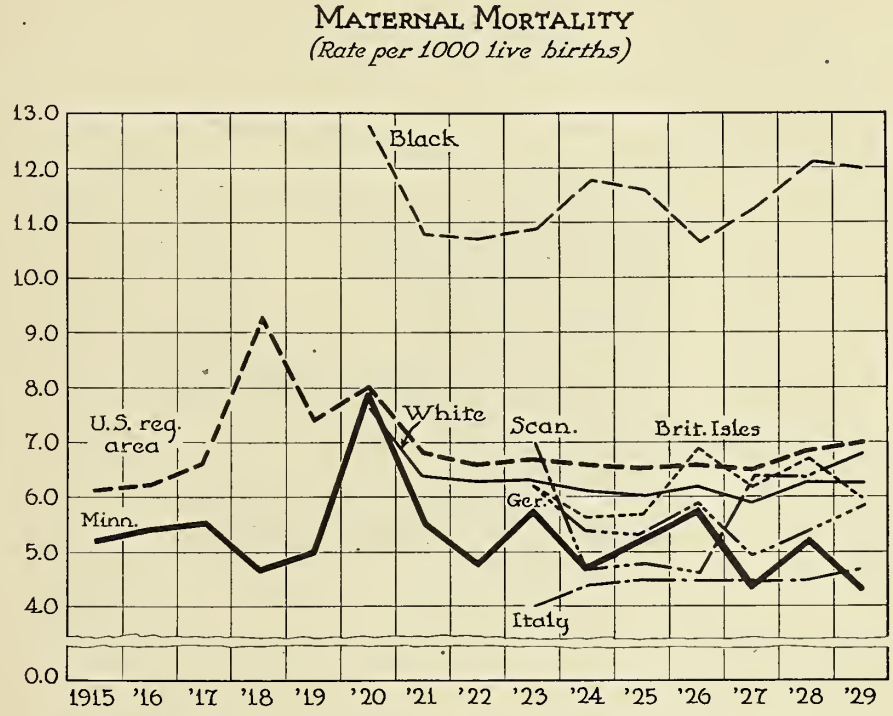


Fig. 2. Comparative maternal mortality rates. The heavy black line indicates the rate in Minnesota; the heavy broken line, the rate for the U. S. registration area. The lighter solid black line indicates the rate for the white population. The broken line, at the top, indicates the mortality rate among negroes.

while that of the registration area remains quite constant, varying only from 6.5 to 7.0 throughout the last decade, while the Minnesota rate dropped 17 per cent. Whether or not the methods of computation are comparable or fair to this country, I thought it would be interesting to compare the Minnesota rate, which is computed in the same manner as the rest of the states, with certain European countries. We have often been told that our low rate was due to our large Scandinavian population. The combined rate of Scandinavia, in 1929, was 6.3 deaths per 1,000 live births, the same as for the white population of our registration area, and the Minnesota rate 4.3, approximately 32 per cent below the "Mother Countries" as well as the U. S. registration area (Fig. 2). The Minnesota rate was also 28 per cent less than that of the British Isles and Germany, and 17.3 per cent less than the combined European average (Fig. 2). Even Italy, which had the lowest rate in Europe, 4.7, was 8

maternal mortality at the beginning and the end of the decade 1920-1929. *Note the remarkable decrease in Minnesota.*

CAUSES OF MATERNAL MORTALITY

The principal causes of puerperal deaths are the infections, the toxemias and the hemorrhages. During the decade 1920-1929, both inclusive, while the total maternal mortality rates have been progressively decreasing, the relation of these total deaths, due to each cause, has remained approximately the same, 40 per cent due to puerperal sepsis, 23 per cent to toxemias and 10 per cent to hemorrhage, and 27 to other causes.

PUERPERAL INFECTION

Figure 4 shows, graphically, the steady decrease of deaths from puerperal sepsis, in Minnesota (except an inexplicable rise in 1923), during the decade 1920-1929. In 1929 there were 82 deaths from infection, which gives the re-

markably low rate of 1.8 fatalities per 1,000 live births. Had the rate remained the same as it was in 1920 (2.9) the deaths from sepsis would have numbered 126 instead of 82, a reduction of nearly 38 per cent, and a saving of 44 lives by improved aseptic technic.

In the U. S. registration area the death rate from sepsis was 44 per cent higher than in Minnesota; excluding negroes it was 33 per cent higher. The European average was 11 per cent, Scandinavia 22 per cent, the British Isles 33 per cent and Germany 61 per cent more than the Minnesota rate. In Italy the only European country with a lower rate (except Russia, which was about the same) than Minnesota, the rate was 11 per cent less (Fig. 4).

It may be argued, with some justification, that comparisons in any one year are not convincing, so I have computed the averages for the decade 1920-1929 and found that the number of deaths from sepsis in the U. S. registration area average was 19 per cent more than in Minnesota (13 per cent, excluding negroes). Complete statistics for Europe are available in the U. S. census reports only, from 1923 to 1929, inclusive. Averaging these years, the Minnesota rate is the same for the seven years as for the decade, 2.1 deaths from puerperal infection per 1,000 live births.

The average European rate for the seven years was 6 per cent: Scandinavia 33 per cent, the British Isles 14 per cent and Germany 19 per cent higher than Minnesota. Italy had a rate, for the seven years, 15 per cent better than Minnesota.

MATERNAL MORTALITY
(Last census reports)

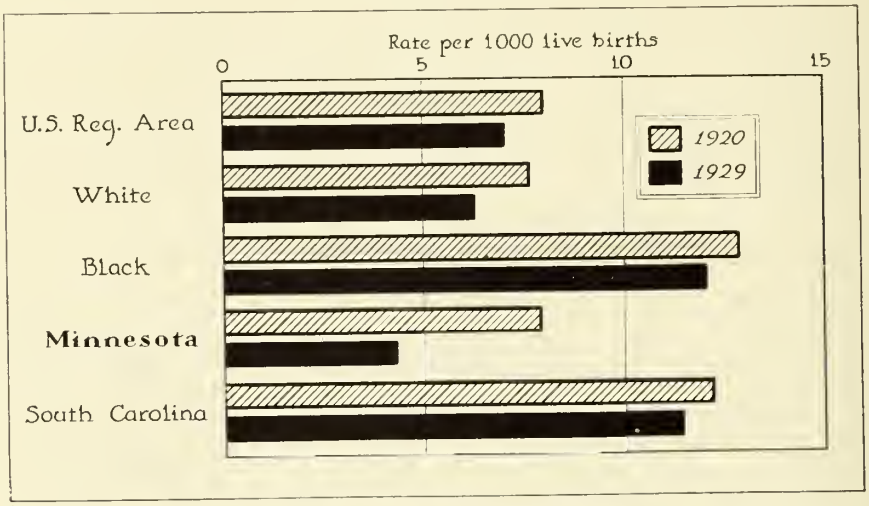


Fig. 3. Changes in the mortality rates during the decade 1920 to 1929 inclusive. The cross hatched line indicates the rate in 1920 and the solid black in 1929.

Time and space do not permit comparisons with all European countries, so we have limited them to those which have furnished many emigrants to Minnesota. This state does not suffer, in comparison with any of the countries, usually cited as having lower rates than the United States.

Minnesota surpasses most of them, is equalled by few, and is second only to Italy and Russia.

That there has been a marked decrease, in this state, in deaths due to puerperal sepsis, may be seen graphically illustrated in Figure 4 and by the fact that deaths from this cause have decreased 38 per cent from the high point in 1920.

The average decrease in the U. S. registration area was 4.2 per cent; the European average decrease was 10 per cent. Some foreign countries have shown increases in septic deaths: Chili 143 per cent, New Zealand 125 per cent, the Netherlands 62 per cent, Australia 31 per cent, Scotland 26 per cent, England and Wales 20 per cent.

It is evident that the physicians of Minnesota are practicing cleaner obstetrics—thus approaching one of the objectives of the White House Conference.

TOXEMIAS

Unfortunately we are unable to give comparative figures for the other two principal causes of puerperal deaths, toxemia and the hemorrhages, comparisons. The average rate for the first decade was 1.43 deaths from toxemia per 1,000 live births and for the second decade 1.09, a decrease of 23 per cent. In 1929 the rate was 37

DEATHS DUE TO PUERPERAL SEPSIS
(Rate per 1000 live births)

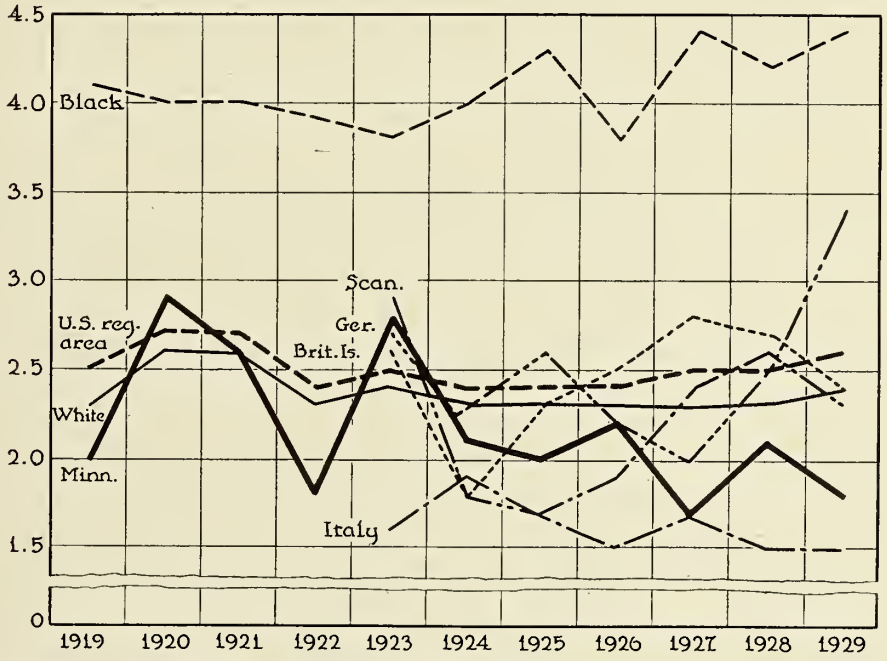


Fig. 4. Mortality from puerperal infection. The heavy black line indicates the rate in Minnesota; the heavy broken line in the U. S. registration area; the lighter solid line the rate among whites; and the short broken line the rate for negroes. The rates for foreign countries are indicated by abbreviations at beginnings of the various lines.

because the U. S. Census Bureau reports tabulate, separately, only deaths due to infection. All additional fatalities are grouped under the title "Other Causes."

Therefore we shall have to be content with an analysis of the deaths from toxemia and hemorrhage in Minnesota alone. Deaths from pre-eclampsia and eclampsia, in 1929, were approximately 50 per cent lower than in 1917, the high peak. These figures, however, hardly give a true idea of conditions, because the rates seem to fluctuate in periods of four to five years.

Figure 5 shows that there was a gradual rise from 1910 through 1913, a sudden drop in 1914, then a steady rise in 1915, 1916, and 1917, when the peak was reached, followed by a fluctuating, but generally downward tendency.

It would seem, therefore, that ten year averages would largely eliminate the indeterminable influences and give opportunity for more accurate per cent less than for the first decade and 17 per cent lower than the second.

Evidently the physicians of Minnesota are giving increasing attention to antepartum (prenatal) care and to the conservative treatment of toxemia, the two principal methods of reducing deaths from pre-eclampsia and eclampsia,—thus approaching another objective of the White House Conference.

HEMORRHAGE

In this state, over a period of twenty-two years, from 1910 to 1931, inclusive, puerperal deaths from bleeding have averaged 10 per cent of the total maternal mortality, less than one death per 1,000 live births.

The average number of deaths from this cause, during the first half of the period of twenty-two years, was 30.6 and during the second half 23.

The rate per 1,000 live births during the first

period was 0.58 and during the second was 0.48, a drop of 17 per cent. So we see that maternal deaths, due to all three of the principal causes, have decreased materially during the last decade

Minneapolis and 3.7 for St. Paul, in ten years, an average improvement of 43 per cent for the Twin Cities—only Oakland, Jersey City and Hartford exceeding them.

DEATHS IN MINNESOTA FROM PRE-ECLAMPSIA & ECLAMPSIA
(Rate per 1000 live births)

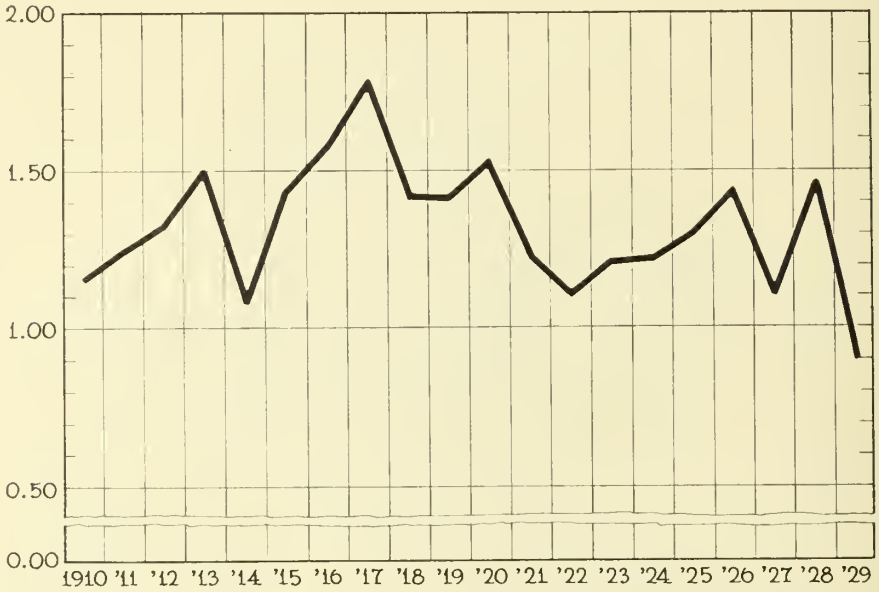


Fig. 5. Irregularly downward rate for mortality from the toxemias.

and are the chief factors in giving to Minnesota the lowest maternal mortality in the country.

It is only fair to say that several other western states, notably Iowa and Utah, have ranked very close and in some years have stood above Minnesota, but ever since the registration area has included most of the states (in 1929 all but two and at this writing all but one) Minnesota has stood at or near the top.

That this state has been improving its obstetric practice progressively is also attested by the fact that in 1920 it stood twelfth in the list, in 1928, fifth, and in 1929, first.

The Twin Cities, while a trifle higher than the whole state, also have a very high rating—Minneapolis, in 1929, standing fourth among the cities of 100,000 or over, with a rate of 4.8 (Minnesota rate 4.3). St. Paul was a close fifth with a rate of 5.0.

In 1920 the rate in Minneapolis was 8.1 and in St. Paul 8.7, an improvement of 3.3 for

INFANT DEATHS DUE TO BIRTH INJURIES

An unhappy chapter in American obstetrics is that on deaths of infants due to birth injuries, which records that, throughout the nation, deaths from this cause have been steadily increasing at a rapid rate. Of the 85,000 deaths at birth, in the United States, 65,000 were due to birth injuries. I had hoped to find in the records that Minnesota physicians had excelled in saving babies, as well as mothers, but truth compels me to say that Minnesota is no exception to the unfortunate, death dealing tendency to hurry the termination of labor by operative means.

It will be seen by Figure 6 that the total number of infant deaths, under one year, has been steadily decreasing since 1910 (we doff our hats to our pediatric colleagues) while the actual number of deaths due to birth injuries and the rate per 1,000 live births have been rapidly rising. Had the rate, from birth injuries, remained the same as in 1910, there would have been only 80

deaths from this cause, in 1929, instead of 249, a sacrifice of 169 babies on the altar of impatience, hurry and injudicious interference with the normal processes of labor.

registration area has decreased but little, the rate in Minnesota has become the lowest in the country, dropping from 7 per 1,000 live births to 4.3, which is 38.8 per cent lower than for the country

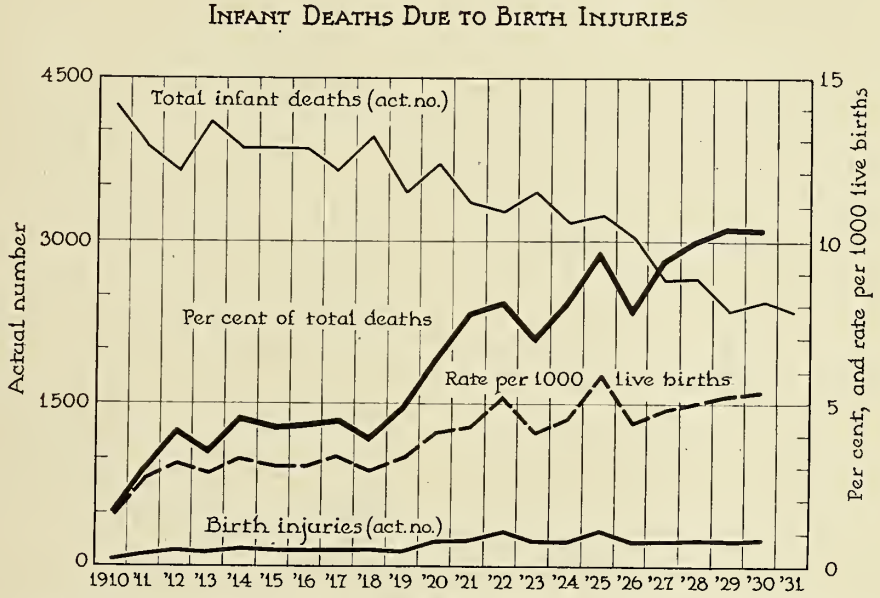


Fig. 6. Deaths from birth injuries. The heavy black line indicates the percentage of the total deaths at birth, due to birth injuries; the broken line the rate; the unbroken line, at the bottom, the total deaths, due to this cause. The light unbroken line, at the top, shows the total infant deaths, under one year.

During the two decades, from 1910-1929, both inclusive, the birth injury deaths increased 236 per cent and the rate per 1,000 live births 211 per cent.

It is difficult to understand how the profession, which has lowered the maternal mortality, so that Minnesota had the lowest rate in the nation, and lower than nearly all foreign countries, could produce such an astounding infant mortality rate from birth injuries.

In this day of decreasing birth rates, it is a social and economic necessity to save as many babies as possible, but it cannot be done if they are born unable to survive on account of birth injuries, which can only be charged to too many operative deliveries.

SUMMARY

The birth rate throughout the country, as well as the whole world, is falling. The Minnesota birth rate has dropped from 24.7 per 1,000 population in 1915, to 18.9 in 1929, a decrease of 26 per cent.

While the maternal mortality rate in the U. S. at large and also lower than the European average.

The principal cause of deaths of mothers, puerperal sepsis, has, in Minnesota, shown the remarkable decrease from 2.9 in 1920, to 1.8 in 1929—33 per cent less than in the registration area, and lower than in nearly all civilized countries.

Deaths from the toxemias of pregnancy are 23 per cent below the average of the previous decade. The deaths from puerperal hemorrhages have also decreased 17 per cent.

In analyzing the results of obstetric practice in Minnesota, there seems to be only one "fly in the ointment," namely, the increasing infant deaths from birth injuries.

Taken all in all, the record of the physicians of this state, in improving obstetric practice, is quite gratifying. I am not bold enough to assert that it is due to good obstetric teaching, but I hope that may be a factor.

I feel quite confident that the work done by the State Department of Health, now under the direction of Dr. E. C. Hartley, in educating

mothers of the state about proper care, has had a real influence.

I wish to acknowledge my indebtedness to Dr. Hartley and Gerda Pearson, both of the State Department of Health, for much appreciated help in gathering the statistics necessary for this analysis.

407, University Hospital.

DISCUSSION

Dr. R. E. Scammon (Minneapolis): I think Dr. Litzenberg is to be complimented on his presentation of the work being done in obstetrics. And I think the practitioners, obstetrician and pediatrician, in the state of Minnesota are still more to be congratulated.

I think it was in the early nineteen hundreds that a French obstetrician, Pierre Budin, wrote a book dealing with the care of premature and full-term infants. In 1907 that book was translated into English and the introduction was written by Sir Alexander Simpson, Emeritus Professor of Midwifery, of Edinburgh. In that introduction Simpson said: "If, in the days of the rising generation, folly should be allowed to override wisdom and the dogs of war howl down the councillors of peace, the place that France would take on emerging from a great world strife might depend largely on the strength of Budin's battalion": meaning the fighting men would be those cared for according to Budin's teachings. A war did break out as Simpson feared. In a sense Minnesota is in such a war with regard to its population and I would like to comment on Dr. Litzenberg's paper by showing you what is happening to this population of Minnesota and how important the care and preservation of the newborn is in connection with this problem.

The population of Minnesota increased rather slowly at first, then passed into a rapid phase that lasted to the nineties, and since that time has been steadily slowing down, so that now the gain in the state is only about 15,000 persons per year.

Chart 1 shows the gain in population in Minnesota, Iowa, and Wisconsin. It shows the numbers of thousands of people added to the population every year. It shows a great rise in population in the various areas with a regular but much reduced increase at the present time. A good part of these gains was due to migration, but undoubtedly some of it represents births.

Chart 2 shows the birth rate and death rate (semi-crude rates)* in the state of Minnesota for the past ten years. It shows the decline in the birth rate that Dr. Litzenberg has described and the fairly stationary death rate. In 1920 there were 55,000+; in 1921, 58,000; in 1930 there were but 47,418 births in the state. We lose from this state about 11,000 persons each year in the exchange of population which is constantly going on between this and other political divisions. Thus the preponderance of the birth rate over the death rate becomes of increasing importance.

A part of the drop in the birth rate is undoubtedly due to the use of contraceptive measures. But it should be pointed out that the birth rate is falling in other districts very largely on account of the later marriages, where contraceptive methods are, in general, taken, for example in the south of Ireland. The birth rate also seems to tend to fall with improved social status. Another factor that we are apt to forget as constantly affecting the birth rate of this area is the change in age distribution of the population in the country. A huge number of young people pioneered this area. When there is a stationary population, there is somewhere about 29 per cent of the population under twenty, 31 per cent or more over fifty, and 40 per cent of the people between those ages. So much of the change we see in birth rate is a perfectly natural and normal thing in an area which is not receiving young immigrants.

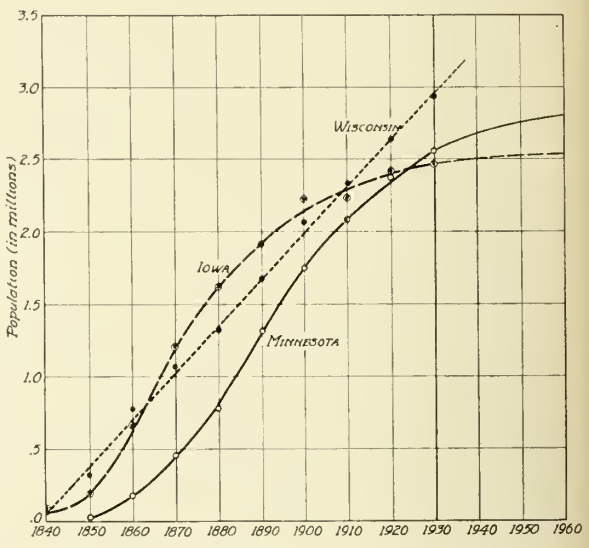


Chart 1. Three calculated curves representing the growth of population in Minnesota (A—solid line); in Iowa (B—long broken line); and in Wisconsin (C—short broken line). The curves are drawn to mathematical formulæ fitted through the census observations that are indicated by various kinds of dots. The populations after 1930 are projected from these mathematical formulæ and presume no extraordinary change in the character of the increase of the people of these states.

Therefore our birth rates are probably very much overestimated with respect to the future. It takes about 15 or 16 births per 1000 of population to keep the population stationary. It is probable that the population in the United States about 1965, and in Germany probably in 1945, will become stationary. I do not know when we will reach the stationary state in Minnesota; it is an extremely difficult thing to estimate; but I am inclined to think that, unless there are unprecedented social and economic changes, this static condition will be reached in a comparatively short time. I want to emphasize again with Dr. Litzenberg the importance of good obstetrical care if we are to have a population which does not decline in numbers.

The United States as a whole apparently made an increase in population of about 16 per cent in the decade from 1920 to 1930; but this increase is probably distinctly over-estimated, due to the facts that at the last census we were able to hire much better enumerators than before, that methods of tabulation have improved, and good roads and mail systems increased, so that the enumerators got in touch with people who had never been reached before. Probably the true increase was closer to 12 per cent than 16 per cent. Next to the United States comes Holland and then Belgium. The high birth rates in these little countries may be associated with the fact that both have outlets through their huge and very rich colonies. Next come Germany, Italy, Minnesota, Norway, France, the British Isles, and Sweden. The rate of increase in Minnesota is approximately that of Norway and far below that of Germany, Holland or Belgium.

I have presented these charts to show the extremely important social implications of the medical data that Dr. Litzenberg has presented this evening.

*"Semi-crude" rates are computed as the ratios of actual births and deaths to the calculated population. Since the population in Minnesota is growing very slowly, there are no significant differences between these figures and those presented by Dr. Litzenberg.

Dr. E. C. Hartley (St. Paul—by invitation): We have been trying in the Department of Child Hygiene of the Minnesota Department of Health to adjust our educational program so far as possible to the trends discussed in Dr. Litzenberg's paper and in the discussion by Dr. Scammon.

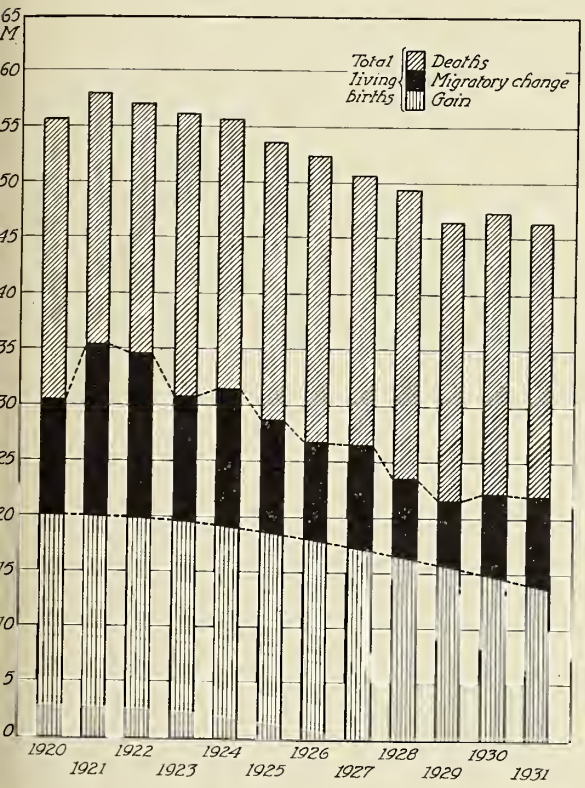


Chart 2. Changes in the population in Minnesota for each year from 1920 to 1931 inclusive. Each column represents (in its entire height) the *live births* of the year. The cross hatched portion of each column represents the deaths in the State during the particular year. The lower, vertically lined portions of the columns indicate the yearly gain part of the population as calculated from the population curves. And the black portion of each column indicates the excess of emigration over immigration in the State. The figure shows (a) the steady drop in absolute as well as relative number of births; (b) the invariable loss of population by migration from Minnesota; and (c) the decrease in gain of people in the State that has fallen from 20 thousand to less than 15 thousand per year in the eleven years under consideration.

Our problem may be quite definitely divided into three parts: (1) distribution of literature on the hygiene of maternity and in infancy; (2) advisory service to the public health nurses of the state; and (3) classwork. This latter is of three kinds: (a) correspondence courses given through the extension division of the University; (b) actual class work with demonstrations; (c) work for girls of eighth grade and high school age. In this work the advantage of proper medical attention is stressed as are the standard preventive measures and accepted rules of hygiene.

The adjustments we are making to the trends mentioned consist of more carefully selecting the individuals and groups who receive this work.

An analysis of population trends shows the beginning of a falling off in the number of eighth grade girls. This reflects the rather abrupt decline in our birth rate which became apparent in 1921. Maternal deaths show relatively little change and this is in part due to the relatively larger proportion of the total births which are now primiparous births and as such reflect the increased hazard of labor in primiparas.

With our class work at the present time we are reaching approximately 20 per cent of the girls of the state belonging to the age group of the eighth grade and about the same proportion in the group represented by the primiparous mothers. It is felt that the number will be adequate to fix communities in an intelligent and informed attitude toward the hygiene of maternity and infancy and toward the contributions which the medical profession has to offer in this portion of its field.

Dr. Hobart Johnson (by invitation): I am sure I have nothing to add to what has been said this evening except that I believe our black man has one point on the white community. Dr. Litzenberg said it was the pediatricians who had been urging the obstetricians to do this antenatal work. In Africa where I have been, supposing the mother dies in childbirth, the husband must pay a heavy fine to the brothers and sisters of the deceased. So far as I know our tribe is the only one which has this custom. I thought it was something we might build on when we begin stressing on antenatal care; just put it up to the husband. Among our black people over 50 per cent of the babies die within the first year; how many die within the first month I do not know. There is no registration there.

Another thing I might mention. So far as I know there is no eclampsia among our people. We have never seen a case and our usual run of cases at the dispensary is from 100 to 300 a day—not, however, in obstetrics alone. There are also surprisingly few cases of puerperal sepsis; why it should not be almost 100 per cent, I don't know, but puerperal sepsis is exceedingly rare though there is not the slightest sense of aseptic technic—indeed there is everything but that.

Dr. Litzenberg (closing): I have nothing particular to add except to thank Drs. Scammon, Hartley and Johnson. Dr. Scammon has hit the nail on the head by drawing attention to certain fundamental trends which bear upon birth rate. We also have a condition which I have not discussed tonight and that is contraception. Our birth rate is more or less rapidly approaching the death rate. That puts it squarely up to the departments of obstetrics and pediatrics to train these young men so that the number of conceptions when they do occur shall result in living babies. The work which the pediatricians have done in this country has been marvelous in saving the babies. We can't do much to alter these fundamental trends. We can't do much about contraceptions; when people do not want babies they are not going to have them. But we can do something to save those who will conceive.

LEUKEMIA AND ITS TREATMENT*

L. H. Fredricks, M.D.
Bismarck, North Dakota

LEUKEMIA was recognized by Hughes Bennett[1] in 1845 and his clinical description was followed by the report of Virchow a month later. Bennett described it under the name of leukocythemia as "a suppuration of the blood attended by enlargement of the spleen and liver." Virchow described it under the name of leukemia or white blood. In 1870 Neuman[11] determined the importance of changes in the bone marrow. The work of Ehrlich,[4] in 1885, enabled one to classify the cases according to the blood changes.

This disease is characterized by the appearance of immature leukocytes and usually by an increase in the normal leukocytes in the blood associated with a primary hyperplasia of the leukopoietic tissues, either myeloid or lymphadenoid, throughout the body. Two distinct types are recognized clinically; (1) the myeloid type characterized by the hyperplasia of the white cells of the marrow (granulocytes) and the appearance of myelocytes to the extent of 20 to 40 per cent of the total leukocytes present in the blood; (2) the lymphatic type in which 80 per cent and over are lymphocytes.

ETIOLOGY

No special cause has been found although recent workers have strengthened the theory that infection plays an important rôle in the production of the disease, and claim that certain microorganisms have been found. Some experimenters have succeeded in conveying chicken leukemia from one chicken to another; similar experiments upon men and ordinary laboratory animals have been unsuccessful. Most of the medical men have been inclined to believe that leukemia is a malignant disease, because of its course and characteristics similar to other malignant diseases.

CLASSIFICATION AND COURSE

Acute lymphatic leukemia occurs most frequently during the first five years of life and in the second decade. After the age of twenty-five its incidence is greatly diminished, and occurrence after sixty years of age is rare. The average duration is from a few days to three weeks.

Chronic lymphatic leukemia usually occurs between the ages of forty and sixty. The average duration varies from four months to five or six years.

Acute myelogenous leukemia is fairly rare. In 1904 Hirschfield[6] found only six undoubted cases. In 1917 Gorham[5] reviewed the literature and could find only twenty-eight autopsied cases of acute myelogenous leukemia. The average duration of the disease was from a few weeks to three months.

The type of chronic myeloid leukemia occurs usually between the ages of twenty-five and forty-five.

The sex predominance in leukemia is about two males to one female.

CLINICAL SYMPTOMS

The most prominent symptoms of leukemia are enlargement of the spleen and adenopathy involving any or all chains of lymphatics. The other symptoms may be melena, loss of strength, undue fatgiue, loss of weight, pain, gastro-intestinal disturbance, hematemesis, hemoptysis, epistaxis, dizziness, syncope, and headaches.

PATHOLOGY

Briefly, in lymphatic leukemia the glands on section appear soft, gray or pinkish in color, smooth, and homogeneous. The tissue is packed with lymphocytes, mostly the small type, not only filling the vascular space, but infiltrating the surrounding tissue.

The spleen shows decided enlargement; the surface of the spleen is smooth and the normal outline preserved. The substance of the organ is filled with infiltrating lymphoid cells and the microscopic structure is almost unrecognizable. The bone marrow is dense and homogeneous, and is gray or grayish red in color. Microscopically, there is almost entire replacement of erythoblastic and myeloblastic tissue by lymphoid cells. The liver is enlarged, and the development of lymphocytic perivascular nodules in the connective tissue is characteristic.

*From the Quain and Ramstad Clinic, Bismarck, North Dakota.

In chronic myeloid leukemia the bone marrow is pink or yellowish gray, and is firm in texture. The tissues are crowded with leukocytes and erythocytic cells, but the chief feature of this intense hyperplasia is the myeloid cell. The spleen is greatly enlarged; it may weigh from two to twenty pounds, and the normal outline is preserved. It is firm and has a grayish tint and cuts with difficulty, due to the great increase of fibrous tissue in the stroma. There is a large number of cells in the tissue, chiefly the myelocytic forms. Hemorrhage and infarct are not uncommon. The liver is enlarged and the capsule contains myeloid cells.

TREATMENT

In the acute types of leukemia the treatment is purely symptomatic. Isaacs[9] reports that eighty-four out of 113 patients suffering from acute leukemia died within two months.

Arsenic had been the favorite drug used in the treatment of this disease before benzol and radiation came to be used. Its administration in some cases caused apparent or actual arrest of symptoms, or remissions. One should try, however, some other agencies first, because frequently arsenical poisoning has occurred.

Splenectomy has been employed in leukemia, but is unjustifiable because the patients all die from the operation, either from primary or secondary hemorrhage.

Benzol as treatment for leukemia was first introduced in 1912 by Koranzi,[8] who observed three female patients who had been poisoned by benzol from the material upon which they were working. These women developed severe aplastic anemia; the white and red cells were tremendously reduced. Upon these observations, Koranzi reports one case of chronic myelogenous leukemia where the white cells dropped from 173,000 to 12,000 after three and one-half months treatment. The patient was in fairly good condition.

In 1912 Kiralyfi,[7] a Hungarian, treated seven cases of chronic myelogenous leukemia with benzol, the length of treatment varying from three to five months. He reports that he obtained normal counts and the patients were symptom-free. Kiralyfi, however, did not report how long his patients were symptom-free. No one seems to be able to duplicate his unusual results.

In 1912 Steen reported a case in which the patient was treated by x-ray and was well for two months. He was then treated with benzol and the white cells fell from 225,000 to 6,000 after forty-two days' treatment.

In 1917 Winslow and Edwards[14] tried benzol in one case. The white cells dropped from 550,000 to 46,000. They observed that there were some symptomatic results, marked gastric irritation, great danger of benzol poisoning, and too rapid decrease of white cells.

Billings,[2] in 1913, reported four cases of leukemia of the myeloid type. One patient had previously been treated with x-ray, excellent results having been obtained, but on account of a severe x-ray burn, this treatment had been discontinued. Benzol was then administered with good results. His other three patients were treated with benzol and x-ray with equally good results. He also reported one case of chronic lymphatic leukemia where x-ray and benzol caused the white cells to fall from 450,000 to 4,900, and the patient showed marked improvement in his condition. Although Billings was enthusiastic about benzol treatment, his report showed that he considered x-ray as an essential part in the treatment.

H. Pancoast,[12] in 1917, reported four cases of leukemia in which benzol was tried. One patient whom x-ray no longer benefited responded to benzol and lived an additional three months. Two of the patients did not respond to benzol, but did to x-ray. The fourth patient was receiving benefit from x-ray, but remained away for a year and a half without being checked up and had a relapse. He was improved under x-ray, but during the hot weather had another relapse and x-ray had to be discontinued. Benzol was tried without any success.

Boardman,[3] in 1916, reported the reduction of the white cells from 202,000 to 18,000 and the lymphocytes from 98 to 77 per cent in one case of chronic lymphatic leukemia with the combined use of x-ray and benzol. Another patient with chronic lymphatic leukemia under benzol treatment alone for one month did not show any improvement. His third patient, suffering from chronic myelogenous leukemia, was under treatment with x-ray and benzol for three months. The last report, five months later, showed that the man was in comparatively good health.

X-ray was first considered as a treatment for leukemia in 1902. Because of the marked development of x-ray technic in the past ten years,

x-ray is bound to take the leading position in the treatment of leukemia. X-ray treatment alone has been proven to be very valuable in leukemia. Minot[10] collected 148 cases from 1898 to 1923 of chronic myelogenous leukemia. The average duration of the disease from the onset of the symptoms, before a definite diagnosis was made, was 1.4 years. He then reported seventy-eight cases of chronic myelogenous leukemia which had received irradiation and the patients lived on an average of 3.5 years after the diagnosis was made; in fifty-two cases not treated by irradiation, the average duration after diagnosis was 3.04 years. Fifty per cent of the seventy-eight treated patients improved sufficiently from a condition of distinct ill health, sometimes bedridden, to a state of comparative well-being. Less than 5 per cent failed to improve to a degree of health that rendered the patient able to do some light work. Definite remissions of moderate degree have occurred in four (7.7 per cent) of the fifty-two patients now under radiation.

In 1924 Minot and Isaacs[9] reported eighty patients with chronic lymphatic leukemia over thirty years of age. Thirty received no irradiation and fifty did. Irradiation did not prolong life. The average duration of the disease in both untreated and treated cases from the time of diagnosis was 3.5 years. Minot also found that the average duration of the disease from the first symptoms until definite diagnosis was made was 1.4 years. He was able to tabulate sixty-one cases in which x-ray had been used. No improvement occurred in twenty-three per cent, rather trivial improvement in 30 per cent, moderate or distinct improvement in 47 per cent, and 10 per cent showed marked improvement. The chances for improvement decreases as the disease progresses, and as time passes x-ray becomes less and less effective. Spontaneous remissions of slight degree occurred in only 5 per cent of the 36 non-irradiated patients, while 57 per cent of the sixty-one patients radiated showed distinct improvement. The patient's improvement is manifested by his sense of well-being. The reasons for these results are that x-ray decreases the most prominent symptom of abnormal fatigue; it lessens the anemia by increasing bone marrow function; it decreases the activity of the lymphatics and lessens the mild or marked symptoms due to pressure from the enlarged internal or external glands.

Deep x-ray therapy was used exclusively in our Clinic. We did not attempt to treat the acute cases, since the prevailing opinion is that these patients do not respond to x-ray treatment. In the chronic cases we radiated the enlarged glands, enlarged spleen and the long bones. The initial dosage used was about one-fourth to one-half of an erythema dose to one or two areas. Further treatment and dosage were guided entirely by the white count. With a rapidly falling count the treatment was stopped when the white count reached 40,000 to 50,000. If the count was decreasing slowly, the treatment was stopped when the white count reached 20,000 to 30,000. An attempt was made to reduce the glands to normal size in two or three treatments, but this was guided entirely by the white count. The patients reported monthly for a white count and radiation, if needed. They usually reported that they felt better and many were able to return to their former occupations.

SUMMARY OF TREATMENT

The treatment of acute leukemia is purely symptomatic.

Extensive use of arsenic in leukemia has been discontinued because of the great danger of poisoning. Splenectomy only hastens the death of the patient. Benzol has been found to be of value in the treatment of leukemia by Koranzi and Kiralyfi only, but they failed to publish the duration of the benefits derived from this form of treatment. Their work has not been duplicated with the success that they claim. Other benzol enthusiasts, like Boardman and Billings, have had to use the x-ray in conjunction with benzol. Minot, who has done more work on x-ray therapy in leukemia, has definitely proven that x-ray is the most valuable form of treatment. Benzol is accompanied by great danger of poisoning, too rapid a decrease of the white cells and in a majority of cases a marked destruction also of red blood cells. It produces, at least, considerable discomfort from gastric disturbance. It cannot be administered intravenously because it causes death, nor subcutaneously because it causes necrosis, and given by rectum it causes marked irritation and cannot be retained. It also is a very difficult drug to control. X-ray under competent men has been proven to be easily controlled, is not dangerous, and it lessens anemia.

Since the excellent results of x-ray treatment

have been authentically duplicated in all parts of the country, the x-ray cannot be replaced by any other method now in use, and assumes the leading place in the treatment of chronic leukemia.

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AGRANULOCYTOSIS*

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DURING the past ten years over three hundred cases have been reported of a severe, frequently fatal illness with a peculiar blood picture, *viz.*, a profound leukopenia with total or almost complete absence of the granular polymorphonuclear cells. Described by Schultz[4] in 1922, this disease, agranulocytosis, presents several distinctive features: a striking predilection for women of middle age or over; sudden onset; marked prostration; high fever; necrotic ulcerative lesions of mucous surfaces, especially the mouth, throat and anus; disappearance of the myeloid or granulocytic elements from the bone marrow, with a corresponding leukopenia and granulopenia in the blood stream; and a rapid, frequently fatal course.

Particularly constant in the agranulocytosis of Schultz are three major characteristics: (1) the practically complete disappearance of the cells of the myeloid series from the bone marrow without demonstrable damage to the erythropoietic system or to the megakaryocytes; (2) the markedly low white cell count with an extreme granulopenia and lymphopenia without hemorrhagic diathesis; and (3) the ulcero-gangrenous lesions in the mouth and genito-anal areas. These three features may be said to correspond to three distinct "onsets," or stages, of the disease as postulated by Roberts and Kracke,[3] *viz.*, a bone marrow onset; a blood stream onset; and a clinical onset. The first stage is confined to the bone marrow and may be looked upon as the prodromal period, being represented clinically by fever and prostration; the second stage is manifested in the blood stream by a marked leukopenia and granulopenia; while the third stage is represented by ulcero-gangrenous lesions, collapse, and frequently death.

The etiology of agranulocytosis is unknown, but the primary site of insult in the disease is undoubtedly in the bone marrow which microscopically shows a complete or nearly complete disappearance of the cells of the myeloid series. Rapid regeneration of these cells, however, with a corresponding increase of the granular leukocytes in the blood stream can take place with recovery or with a period of temporary improvement. This can be clearly demonstrated at autopsy or by biopsy, as well as by an increase in neutrophils in the leukocyte counts during recovery or improvement.

The necrotic ulcerative lesions of agranulocytosis occur most commonly on the tonsils, which at first are enlarged and reddened but soon become covered with a greyish or yellowish exudate which may cause sloughing of the involved areas. Other parts of the oral cavity—the pharynx, uvula, soft palate, gums and tongue—may be the site of involvement. Identical lesions

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may also develop in and about the external genitalia and anus. The gastro-intestinal tract, particularly the esophagus, may be extensively involved. Bullous cutaneous lesions may, in addition, be occasionally present. The typical mucous membrane lesion of the disease is characterized first by an intense local exudative inflammation not unlike that caused by diphtheria. This is soon followed by an ulcero-gangrenous process which often causes sloughing of the involved mucous membrane, producing additional or multiple ulcerative lesions of identical appearance. These may coalesce to produce an irregular, extensive lesion, or there may be isolated ulcers on various parts of the mucous surface. The base of the ulcer is usually filled with a thick, yellowish or greyish necrotic exudate which emits a strong, fetid odor. Microscopically the lesion shows deeply extending necrosis without definite separation from the surrounding normal tissue and exhibiting no marked cellular reaction or neutrophilic infiltration.

The following cases illustrate typically the various manifestations of agranulocytosis.

Case 1.—A white woman, aged fifty-three, was brought to the Miller Hospital on November 26, 1931, in extremis. Her past history revealed the following important features: an unusual susceptibility to severe "colds"; a leukocyte count of 6,400 with 50 per cent polymorphonuclears in 1924; an attack of acute thyroiditis in January, 1931, with a basal metabolic rate of minus 30 per cent, which improved under thyroid extract; and a leukocyte count of 4,300 with 40 per cent polymorphonuclears in April, 1931. The history given of her present illness was that on November 16, 1931, she had developed a sore throat with pain on swallowing. A patchy grey membrane had then appeared on the tonsils, cultures from which proved negative for diphtheria. Her temperature had averaged between 101° and 102°. Weakness and prostration were profound, and the course of the disease had been rapidly downward.

On admission to the hospital she was in a deep stupor. The mucous membranes of the mouth and pharynx were red and swollen. The tonsils were covered with a dirty greenish necrotic exudate. The tongue was greatly swollen and showed numerous pin-head areas of necrosis. Two leukocyte counts showed the total number of cells to be only 200 and 150, respectively, with complete absence of polymorphonuclear cells. The hemoglobin was 67 per cent; red cells 3,760,000. Blood smears showed a normal number of platelets. Death occurred a few hours after admission, ten days from the onset of the first symptoms. No autopsy was obtained.

Case 2.—A white woman, aged fifty-eight, who had complained for two months of tiring very easily and of swelling of the ankles with shortness of breath, suddenly developed a sore throat with marked weakness and fever on March 1, 1931. A year before, an examination which she had undergone had revealed a systolic blood pressure of 230, an enlarged heart, and a leukocyte count of 6,000.

When first seen on March 4, 1931, three days after the onset of her acute symptoms, the throat was diffusely inflamed, prostration was extreme, temperature 100.8°, pulse 110, leukocyte count 1,200, hemoglobin 40 per cent, erythrocytes 2,000,000. The urine contained albumin and casts. On March 5 the leukocytes were 800 with a complete absence of granular cells, lymphocytes comprising 95 per cent, monocytes 5 per cent. On March 6 the leukocyte count had still further dropped to 340, death occurring a few hours later, five days after the acute manifestations of her illness began. Autopsy showed hypertrophy of the heart (weight 390 gm.); hypostatic pneumonia; and an "apparently normal" bone marrow.

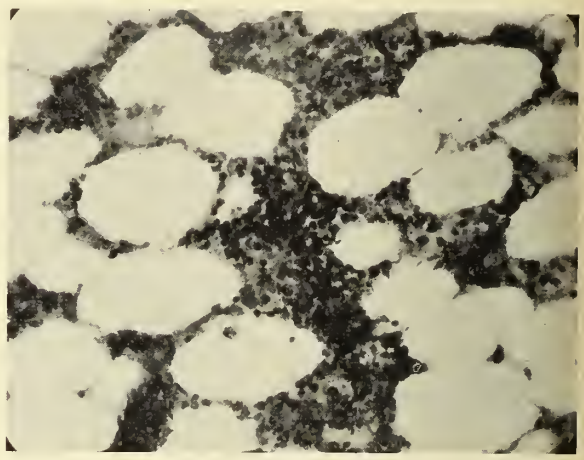


Fig. 1. Bone marrow from Case 3, showing absence of granulocytic elements.

Case 3.—This case, published through the courtesy of Dr. J. M. Hayes and Dr. M. Barron, is that of a white woman, aged sixty, who was admitted to St. Mary's Hospital on November 17, 1931. She had always been previously healthy but had recently been undergoing treatment for a sinusitis when, on November 11, 1931, she developed a sore mouth with headache, nausea, vomiting and fever. On admission to the hospital, prostration was marked, temperature 104°, pulse 100. Small discrete ulcers were present on the mucous membrane of the lips, mouth, palate and pharynx, with an impetiginous eruption over the lower lip. The total leukocyte count was 500, with a complete absence of polymorphonuclear cells. The hemoglobin was 67 per cent, erythrocytes 3,700,000. The urine showed one plus albumin. Examination was otherwise negative.

During the first twenty-four hours in hospital she was given two transfusions. Following these the leukocyte count rose to 1,000. Two days later the leukocyte count was 600 in the morning and 300 in the after-

noon with no polymorphonuclear cells present. Two more transfusions were then given without any improvement. The leukocytes dropped to only 100 cells. The temperature rose to 105°, pulse to 135, and respirations to 50. Death occurred on November 21, ten days after the appearance of the first symptoms.

Autopsy showed a red bone marrow containing no granulocytic elements (Fig. 1); a large soft spleen;



Fig. 2. Extensive ulceration of esophagus in Case 6.

broncho-pneumonia; an enlarged heart (400 gm.); and a soft friable liver.

Case 4.—A white woman, aged thirty-four, who had been acutely ill for a week with a high fever, extreme weakness, and pain in the rectum, had a thrombotic hemorrhoid excised in a physician's office under local anesthesia on May 16, 1930. Immediately following this she collapsed and was removed to St. Luke's Hospital, where she remained twenty-four hours. The leukocyte count on this admission was 1,000, the hemoglobin 47 per cent. Two days later she was readmitted on the service of Dr. Warner Ogden, through whose courtesy the case is published. On examination the site of the hemorrhoidectomy was covered with a dirty, greyish, membranous exuduate which emitted a foul odor and showed Vincent's organisms in abundance in smears. Prostration was extreme. In the blood examinations the outstanding feature was a marked leukopenia with complete absence of polymorphonuclear leukocytes, all of the cells being lymphocytes of the mature type. Leukocyte counts made daily ranged from 550 to 1,000 with no granular cells found on any examination. Hemoglobin estimations averaged 50 per cent, red cell counts 4,500,000. The course of the disease was rapid, marked by extreme prostration, chills, temperatures of 103° and 104°, and a high pulse rate. Death occurred on May 24, fifteen days after the onset of the first symptoms.

Case 5.—A white woman, aged sixty-five, developed an "acute cold" with a sore throat on January 26, 1932. In the course of the next few days she became very weak and her throat grew steadily more painful. When first seen, one week after the onset of the initial symptoms, she was in a state of extreme collapse with a pulse rate of 140 and a temperature of 104°. A marked exudative inflammation with a strong fetid odor involved the entire throat, and moist râles were present throughout both lungs. Immediate administration of antistreptococcic serum failed entirely to result in any response, death occurring a few hours later. At autopsy the chief findings were: large numbers of megaloblasts with absence of granulocytes in bone marrow smears; enlargement of the heart (wt. 450 gms.); diffuse congestion of the lungs; and a growth of hemolytic streptococci in cultures from the spleen and throat.

Case 6.—This case, published through the courtesy of Dr. Alfred Hoff, is that of a white woman, aged sixty-four, who was admitted to St. Luke's Hospital on March 23, 1929, with a fluctuating painful swelling which had been present for twelve days below the angle of the left jaw. The tonsils were enlarged and reddened, the temperature 101°, and the leukocyte count 3,500. Following the establishment of drainage the suppurative adenitis healed uneventfully with a prompt return of the temperature to normal.

One month later an upper molar tooth was extracted and within twenty-four hours the gums, the throat and the palate had all become extremely swollen and painful. Two days later she was readmitted to the hospital in a state of profound prostration. The gum at the site of the extraction was now gangrenous. Adjoining it was a deep ulcer covered with a thick, grey, tenacious exudate, while all of the surrounding gum tissue was red, swollen and spongy. Smears showed Vincent's organisms, and a non-hemolytic streptococcus grew in cultures from the exudate. The leukocyte count was 4,300 with only 4 per cent polymorphonuclears. The hemoglobin was 70 per cent, red cells 3,500,000.

Progress was exceedingly slow. Weakness was extreme. The lesions on the gums gradually healed but another painful stubborn ulcer developed in the rectum. There was a daily fever ranging from 99.5° to 102°. A constant leukopenia was a striking feature, the leukocyte count averaging 3,800 (20 counts), the lowest being 1,360. The polymorphonuclears were continuously low, their average being 8 per cent, the remainder of the white cell differential being made up of 79 per cent lymphocytes, 13 per cent monocytes. No anemia developed (hemoglobin 75 per cent, red cells 4,000,000). Platelets 120,000. Bleeding and coagulation times normal. Blood cultures negative.

After five weeks in the hospital she was discharged improved on June 8, 1929, and during the next two months continued to improve slowly but steadily, gradually resuming her full activities. Complete healing of the rectal ulcer finally occurred, and the blood count returned to an absolute normal.

On August 6, 1929, she developed a sudden pain in the right chest, with vomiting and tarry stools. Signs of consolidation appeared rapidly in the lower lobe of the right lung, and in forty-eight hours she was comatose. Death occurred on August 9, 1929. A blood examination on the day of her death gave the followning figures: hemoglobin 90 per cent, erythrocytes 4,500,000;

leukocytes 7,000 with 76 per cent polymorphonuclears, 22.5 per cent lymphocytes, 1.5 per cent monocytes. Platelets were plentiful in the smears.

The findings at autopsy were as follows: Esophagus: walls thickened and edematous; mucosa diffusely ulcerated, the base of the ulcer being of a dark purplish color with only a few small scattered islands of swollen mucosa remaining (Fig. 2); microscopically there

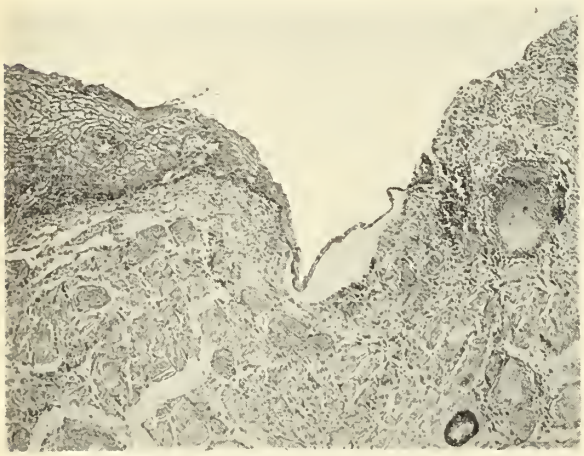


Fig. 3. Microscopic appearance of the esophageal ulceration in Case 6.

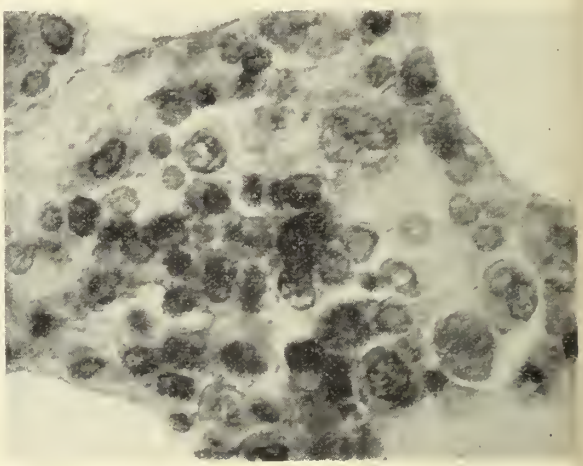


Fig. 4. Bone marrow in Case 6, showing active hyperplasia of all elements.

is extensive ulceration of the esophageal mucosa with areas of epithelial thickening and regeneration, the base of the ulcer showing dense fibrosis and markd congestion with patchy infiltration of a few leukocytes (Fig. 3). Lungs: the main bronchi show patchy exfoliations of the epithelium and areas of extensive ulceration with fibrosis and congestion, with infiltrates in varying numbers along the base of the ulcers; the lower lobe of the right lung shows thrombosis of the main artery with hemorrhagic infarct of the involved areas and patchy infiltration of polymorphonuclears throughout. Heart: 425 grams, left ventricular hypertrophy. Terminal ileum and colon: diffuse edema and congestion of mucosa. Kidneys: cloudy and swollen; right, 165 grams; left, 145 grams. Bone marrow of right femur: red meaty tissue in excess amount showing microscopically active hyperplasia of all elements (Fig. 4).

DISCUSSION

The close similarity in all of the findings in these six cases of agranulocytosis is very striking. The sudden onset in women of an acute, rapidly progressive illness with fever, prostration and necrotic ulceration of mucous surfaces, together with a profound leukopenia and a complete or almost complete absence of the polymorphonuclear leukocytes, form a syndrome which is most distinctive. In Case 5 even without a blood examination the diagnosis of agranulocytosis can be made on the bone marrow findings with the clinical triad in a woman, of fever, prostration and mucous membrane lesions. In Case 6 it is most probable that the ulcerative lesions in the esophagus and bronchi were originally present during the acute attack of agranulocytosis three months before death, and that they persisted during the period of prolonged convalescence. This patient actually had never fully recovered from the attack and the lesions must have remained more or less active during the period of supposed recovery. It is reasonable to believe that the pulmonary complication which caused death in this case was brought about by the acute activation of the ulcers, particularly of the bronchi. The presence of neutrophils in the exudate, indicating return of leukopoiesis in the bone marrow during convalescence, as is evidenced, too, by the return to a normal leukocyte count, is of particular interest in Case 6.

Failure of the myeloid element in the bone marrow is the fundamental feature in agranulocytosis. With the resultant withdrawal of the leukocytes from the blood stream, the chief barrier of defense against bacterial invasion is down, and unless a rapid reappearance of granulocytes occurs, a fatal outcome, preceded by collapse and sepsis, is inevitable. The underlying basis for therapy in agranulocytosis, therefore, logically consists in the use of measures directed toward the stimulation of the inactive bone marrow. Of

the numerous agents employed for this purpose, the recent addition of pentose nucleotides[1, 2] marks the greatest advance in the treatment of the condition.

Agranulocytosis, instead of pursuing an acute course, may in rare instances occur in a chronic recurrent form. The following case is an example of this type:

Case 7.—A white woman, aged forty-eight, was admitted to the Miller Hospital on January 12, 1932, because of weakness, fever, swelling and ulceration of the lips, tongue and gums, ulcers of the rectum, and loss of weight. The present illness had started two years before with a severe sore throat, fever and weakness, which had kept her in bed for a month. Since then, she had had four similar attacks. Bone marrow administration and x-ray treatments to the long bones had apparently had no influence on the course of the disease. Her present sore mouth and throat had begun a week before admission, and, in addition, she had developed painful anal ulcers with severe diarrhea. She was so prostrated that she could hardly move because of the extreme weakness. Her family history was negative.

On examination, the lips and tongue were red and swollen, and presented several round, punched-out ulcers, the size of a pea and of a grayish color, also numerous small white scars from previous ulcers. The tonsils and pharynx were clear. The heart and lungs were normal. Blood pressure, 100 systolic, 66 diastolic. The spleen was enlarged and firm, the lower pole descending 5 cm. below the costal margin. The rectal and anal mucosa was swollen and red, and proctoscopic examination revealed several chronic ulcers with much inflammatory reaction, which bled easily and were very painful. The leukocyte count on admission was 800. The following day the leukocytes were 1,050 with 12 per cent neutrophils and 85 per cent lymphocytes, hemoglobin 51 per cent, erythrocytes 3,310,000. The temperature ranged from 99° to 102.2°.

The progress of the case during her hospital stay of thirty-four days was not encouraging. The mouth and rectal lesions slowly healed but the size of the spleen increased and free fluid developed in the abdominal cavity. The blood picture remained essentially unchanged, a marked leukopenia and granulopenia being constant. Bone marrow feeding had no influence on the blood counts. Various investigations, including roentgen evidence of any gastro-intestinal lesion, search of the stools for amebæ, and blood cultures, were all negative. In spite of the evidence to the contrary on the part of the abdominal findings and the blood picture, with the healing of the mucosal ulcers, the patient insisted she was very much improved and left the hospital on February 16, 1932, with a leukocyte count of 550.

The leukocyte counts over a two-year period in this remarkable case are shown in Table I.

TABLE I. AGRANULOCYTOSIS (CHRONIC, RECURRENT)

Case 7

Date	Total W.B.C.	Granulocytes
Jan. 31, 1930	2,040	14
Feb. 3	2,100	28
Feb. 4	1,740	
Feb. 5	1,950	
Feb. 8	2,000	
Feb. 13	2,300	
Feb. 15	1,840	
Feb. 21	1,600	36
Mar. 6	1,100	53
Aug. 5	1,250	
Oct. 2	1,000	14
Oct. 29	1,100	17
Nov. 3	1,275	20
Dec. 16	2,150	29
Aug. 25, 1931	1,840	22
Nov. 17	711	
Nov. 29	644	20
Nov. 30	1,460	
Dec. 1	3,760	
Dec. 2	1,020	
Dec. 3	1,140	
Dec. 4	1,100	
Dec. 5	754	
Jan. 12, 1932	1,050	12
Jan. 13	750	16
Jan. 16	500	
Jan. 18	500	34
Jan. 19	850	
Jan. 20	525	
Jan. 21	900	
Jan. 22	750	
Jan. 23	1,175	
Jan. 25	1,650	59
Jan. 26	1,350	
Jan. 27	850	
Jan. 28	1,250	
Jan. 29	1,000	
Jan. 30	1,000	
Feb. 2	850	
Feb. 3	925	
Feb. 4	950	
Feb. 5	875	46
Feb. 6	825	
Feb. 8	850	
Feb. 9	550	
Feb. 10	800	
Feb. 11	550	25
Feb. 12	775	
Feb. 13	625	12
Feb. 15	575	
Feb. 16	550	

Summary of Case 7: Constant leukopenia and granulopenia for two years. Six separate attacks of fever with marked prostration and necrotic ulcers in mouth, throat and rectum. Symptomatic but not hematological recovery in intervals. Treatment: X-ray exposure to long bones, bone marrow and liver feeding.

In addition to agranulocytosis with its unknown causation, reduction in the granular leukocytes may be produced by several well known factors. All such conditions may be convenient-

ly classified, therefore, under the general term of "the granulopenias," as follows:

THE GRANULOPENIAS

(A) Primary
1. Acute agranulocytosis (Schultz)
2. Chronic or recurrent agranulocytosis

(B) Secondary
1. Blood dyscrasias (Hem. diathesis)
   - Pernicious anemia
   - Splenic anemia
   - Acute leukemia
   - Thrombocytopenia
   - Aplastic anemia
2. Infectious
   - a. Bacterial (Acute)
     - Sepsis
     - Typhoid
     - Influenza
     - Malaria
     - Exanthemata, etc.
   - (Chronic)
     - Focal infection
   - b. Toxic
     - Diphtheria, etc.
3. Chemical
   - Benzene
   - Arsenic, etc.
4. Radiation
   - Roentgen rays
   - Radium

As an example of a secondary granulopenia of the infectious type, the following is a case due to typhoid fever:

Case 8.—A white woman, aged sixty-four, was admitted to the hospital on August 22, 1928, complaining of pain and soreness in the anus and rectum, weakness, and fever. She had been under treatment for a rectal fistula for six weeks, and had been confined to bed for three weeks prior to admission with an acute febrile illness.

On admission, there were several small fistulæ about the anus and buttocks with a zone of considerable inflammation around them. The abdomen was diffusely tender. The leukocyte count was 1,200 with a complete absence of polymorphonuclear cells. The hemoglobin was 79 per cent, red cell count 4,000,000. The Widal was negative. Van den Bergh was positive. The urine showed a trace of albumin.

The temperature rose rapidly to 105.8°, prostration was extreme, and death occurred on the third day after admission.

The autopsy findings were as follows: Moderate jaundice. Three small ulcers in the anus each 5 mm. in diameter. Heart, 250 gm., myocardium soft. Lungs, negative. Spleen, 200 gm., soft pulp. Liver, 1,775 gm., swollen. Numerous small punched out ulcers with necrotic bases in the terminal portion of the ileum, in the cecum, and in the transverse colon. Mesenteric and retroperitoneal nodes enlarged, soft and hyperplastic. Bone marrow, fatty. Blood culture positive for typhoid bacilli. Widal positive.

The following case also belongs in the group of secondary granulopenias of the infectious type, in this instance due to chronic sinusitis:

Case 9.—A white man, seventy-two years of age, began a succession of severe "colds" in April, 1931, which persisted up to the time of his admission to the Miller Hospital on June 19, 1931. Shortly before, he had noticed swelling in the region of the left eye with disturbed vision, particularly diplopia when trying to look up.

Examination revealed the right nostril occluded with a deflected septum, middle turbinate swollen and injected, and a scanty mucoid secretion but no pus. A few days later there was definite evidence of a subacute, suppurative spheno-ethmoiditis with a discharge of pus from that region. His blood count at that time was hemoglobin 65 per cent, erythrocytes 3,800,000, leukocytes, 1,500 with 32 per cent polymorphonuclears. This was essentially the same as on previous examinations in which the leukocyte count had varied from 2,050 to 4,800, with polymorphonuclears from 65 per cent down to 7 per cent. Following a transfusion a left middle turbinectomy and exploration of the ethmoidal and sphenoidal sinuses were carried out on June 28. A few days later, stiffness of the neck with a bilateral Kernig and clouding of the mentality developed. A purulent discharge continued from his sinuses and for more than a week his condition remained unchanged. He was then given two more transfusions which were followed by a distinct improvement.

Daily complete blood examinations until July 31 remained about the same with the hemoglobin varying from 54 to 76 per cent, leukocyte counts from 1,500 to 4,350, with polymorphonuclears from 10 to 60 per cent. Morphologically, the neutrophils showed toxic changes with many degenerative band forms, the monocytes exhibited toxic granulation and vacuolization, while some of the lymphocytes were atypical but not immature.

With clinical improvement the leukocytes increased, and from August 15 to October 9, rose from 4,550 to 8,800, with a polymorphonuclear range from 20 to 50 per cent. He was discharged recovered on October 9, 1931, with a hemoglobin of 71 per cent, erythrocytes 4,110,000, leukocytes 5,800, 48 per cent being neutrophils and 43 per cent lymphocytes.

SUMMARY AND CONCLUSIONS

Agranulocytosis presents three major characteristics: (1) the practically complete disappearance of the cells of the myeloid series from the bone marrow without demonstrable damage to the erythropoietic system or to the megakaryocytes; (2) a profound leukopenia with total or almost complete absence of granular leukocytes, and a lymphopenia, without hemorrhagic diathesis; (3) ulcero-gangrenous lesions of the mucous surfaces, especially the mouth, throat, and anus. The disease shows a striking predilection for women of middle age or over, and is marked by a sudden onset, extreme prostration, high fever, and a rapid, frequently fatal course.

Although the exciting cause of agranulocytosis is unknown, leukopoietic deficiency may exist long before active clinical manifestations of the disease appear (Case 1).

We are of the opinion that in agranulocytosis there is primarily a selective, specific injury to the leukopoietic elements only of the bone marrow, and that in this limited sense the condition should be considered a distinct clinical entity.

We are further of the opinion that the attempts which have been made to depart from the original concept of the symptom-complex are misleading. Rather is it an advantage to preserve the syndrome as a distinct entity and to adhere, with minor modifications, to the cardinal diagnostic criteria originally laid down by Schultz in 1922.

A sharp distinction must be drawn between agranulocytosis, or primary granulopenia of unknown causation, on the one hand, and the granulopenias which are secondary to blood dyscrasis, infections, and chemical and radio-active agents, on the other. To facilitate this, a classification of the entire group of granulopenias is submitted.

The treatment of agranulocytosis consists of attempts to induce and maintain active leukocytic formation. Of the numerous measures employed to accomplish this through stimulation of the inactive bone marrow, the nucleotide preparations (pentnucleotide), which have recently been introduced, have proved to be the most effective. It must be recognized, however, that even with complete hematological recovery, mucosal ulcerations may persist and eventually cause death (Case 6). Complete exhaustion of leukopoietic function predicates a fatal termination.

Nine cases are discussed in this report. The first five are typical examples of the acute fulminating type of agranulocytosis. The sixth case is of unusual interest in that despite complete hematological recovery, death occurred at the end of five months as a direct result of active mucosal ulcerations in the esophagus, trachea and bronchi. Case 7 represents a chronic recurrent form of agranulocytosis very rarely seen. In this instance a constant extreme leukopenia and a granulopenia had been known to exist for over two years, during which period six separate attacks of fever with marked prostration and necrotic ulcers in the mouth, throat and rectum had occurred, with symptomatic but not hematological recovery in the intervals. Cases 8 and 9 are examples of secondary granulopenias, Case 8 particularly illustrating the difficulties which may be encountered in the correct classification of a granulopenic syndrome.

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ACUTE MONONUCLEOSIS OR GLANDULAR FEVER*

REPORT OF CASE

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Minneapolis

I AM reporting this case chiefly for two reasons: first, because I believe these cases are more common than is generally recognized at present, and, second, to re-emphasize the importance of careful morphological studies of blood cells in all diseases or conditions involving any part of the hemopoietic system.

All of us have observed and recognized abnormal lymphoid reactions following certain infections. Turk,[16] Naegeli,[10] Cabot,[3] Cross[4] and many others have reported examples. The following question still remains unanswered, namely, why does apparently the same infection in one person cause a high degree of lymphoid reaction, in another a fatal leukemia; in one a lymphatic

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and another a myeloid reaction? One lives with full restitution, the other dies.

The case I am about to report is interesting in that it presents most of the typical clinical and

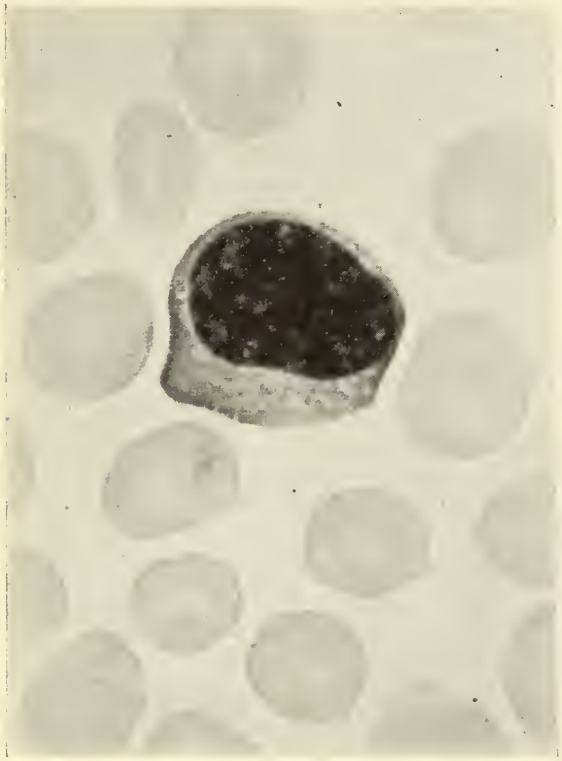


Fig. 1. Most common type of abnormal lymphocyte. Note coarse, hazy network of chromatin with some heavy strands and condensed masses not clearly separated from parachromatin.

hematological features of glandular fever and was first diagnosed as acute lymphatic leukemia.

The patient, L. K., is a young man twenty-two years of age who had always been well except for an attack of scarlet fever when fifteen years old. He came to my office on June 21, 1932, complaining of a fever of 100 to 103 degrees F., for the past two or three days. The week previous to that he had noticed he was very tired and had an almost constant headache. The week before that he had been on a fishing trip. Since having the fever, he had perspired freely at night, lacked strength or "pep" and had a constant dull pain over the lower abdomen not influenced by intake of food, action of bowels or bladder. The past two days he thought the glands in his neck were beginning to swell.

Physical examination at this time revealed a temperature of 101 F., pulse 84 and respirations 20. Eyes, ears and sinuses were normal. The throat and gums were very red and angry looking. Many of the cervical glands were enlarged and tender, as were also the axillary, intercostal and inguinal glands. The heart and lungs were normal and the blood pressure 90 systolic, 60 diastolic. Abdominal examination was negative except for a slightly enlarged and palpable spleen. Urinalysis at this time was normal. A blood examination was as follows: Erythrocytes 5,230,000, hemoglobin 80 per cent, leukocytes 7,400. A differential count showed 45 per cent neutrophiles, 1 per cent basophiles, 2 per cent large monocytes, 50 per cent lymphocytes and 2 per cent plasma cells. A Mantoux intracutaneous test using 0.1 mg. O.T. proved to be negative. A blood test for syphilis, typhoid and Malta fever was also taken on the first visit, all of which proved to be negative. I advised him to go to bed, keep a record of temperature and pulse, and take a five grain amidopyrine tablet if his fever went over 103 or caused him discomfort.

The next day he felt much worse, his throat being more sore, and his headache and lower abdominal pain greater. The following two days he seemed about the same except that his temperature was gradually subsiding but the glands were enlarging. On June 25, his temperature was normal all day. He felt better but the glands all over his body, and the spleen, were much larger, the latter extending 2 to three cm. below the costal margin. His blood pressure was 100/65. The gums were red and spongy, bleeding on the slightest trauma. The throat was still very red and angry looking. A blood study on this day showed leukocytes to be 17,400, 25 per cent neutrophiles, 1 per cent eosinophiles, 14 per cent large monocytes and 60 per cent lymphocytes. His temperature remained normal from this time on, although he felt very weak. The pains in his head and lower abdomen gradually disappeared and the gums and throat became normal again in about a week. The enlargement of the glands and the spleen remained the same until July 6, a few new ones appearing each day in the neck, lastly in the submental region. From then on, the glands and spleen began slowly to diminish in size and seemed to reach normal about July 27. His strength and feeling of well-being returned about the same time.

The study of the blood picture during this time was exceedingly interesting. The first blood count made showed 7,400 leukocytes with 50 per cent lymphocytes and 2 per cent plasma cells. A morphological study of the cells showed many of these lymphocytes to be abnormal in appearance. The most common abnormal lymphocyte in my case corresponds closely to Type III, Figures 8, 9 and 10 in Downey's series[5] (Figs. 1, 2, and 3). The nucleus is often lobulated, and its size in relation to the cell varies. The chromatin forms a rather coarse hazy network with some heavy strands and condensed masses not clearly separated from the parachromatin (Fig. 1). In some of the cells, the arrangement of the chromatin is more diffuse, which gives it some semblance to a lymphoblast (Fig. 3). In others the chromatin is more coarse, resulting in a more definite network (Fig. 2). No definite nucleoli were found in any of the cells, although some showed small, dense, round masses of chromatin. Vacuolation was noted in some of the nuclei as well as the cytoplasm. Many of the cells showed very irregular nuclei, frequently placed eccentrically. The cytoplasm of most of the lymphocytes was the same, varying in amount with the size of the cell and varying in degree of basophilia.

With Wright's stain the spongioplasm was bluish-gray, finely granular on a somewhat yellowish background of hyaloplasm. Vacuoles were numerous and some of the cells contained azurophile granules, fine and carmin red as usually seen in lymphocytes. This characteristic type

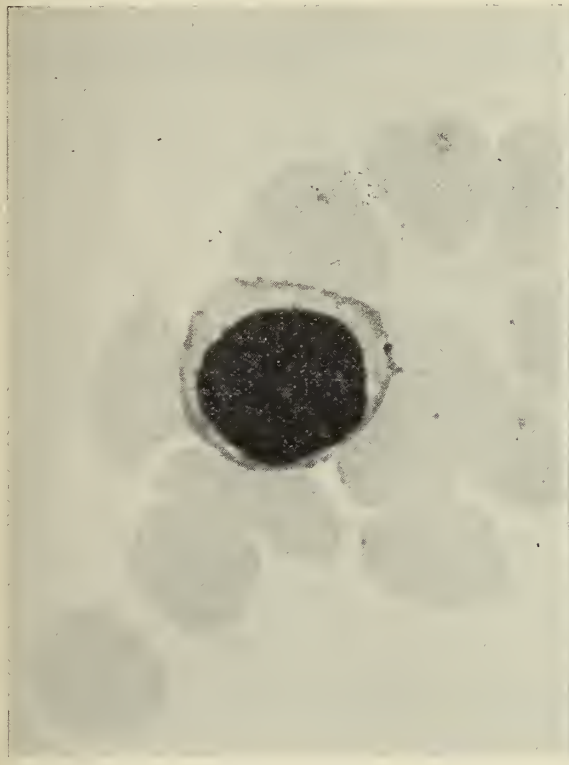


Fig. 2. Chromatin is more coarse, resulting in a more definite network.

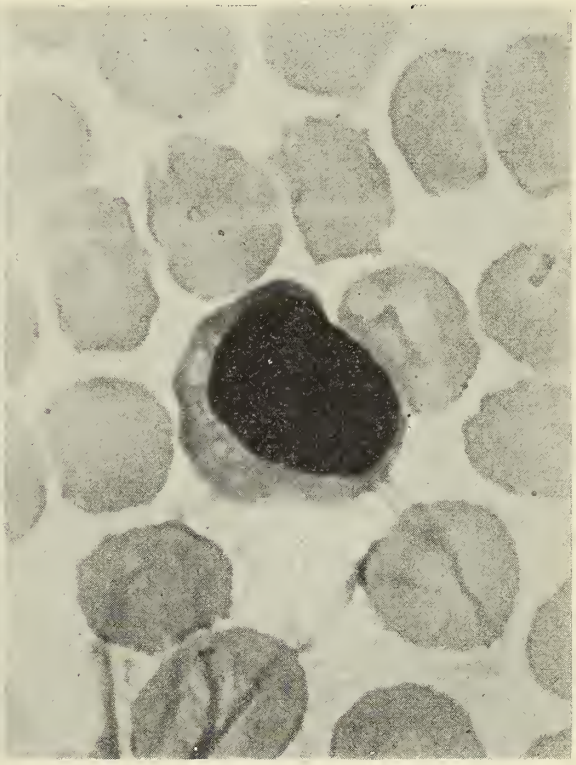


Fig. 3. Note diffuse arrangement of chromatin resembling a lymphoblast.

has been described by Downey as a "highly differentiated, mature leukocytoid lymphocyte." Occasionally a cell was seen with the nucleus smaller and the cytoplasm larger, not so basophilic but vacuolated. These resembled somewhat a plasm cell, derived from a lymphocyte (Fig. 4). They corresponded to Figure 7 of Downey's Type II.[5] Downey distinguished these types of abnormal lymphocytes and found that certain types predominated in certain cases. His Type III, illustrated by Figures 8, 9 and 10 in his plate, are similar to the predominating abnormal lymphocytes in my case. The polymorphonuclear leukocytes showed a shift to the left according to the Arneth classification. Many of the nuclei had only two or three lobes and were horseshoe in shape (Fig. 5).

The second leukocyte count, made on June 25, was 17,400, with 74 per cent lymphocytes, most of which were the abnormal types just described.

The next leukocyte count, made four days later, was 21,000, with 86 per cent lymphocytes. At this time his fever had disappeared but the glandular and splenic enlargement were at their peak.

He returned one week later, July 7, feeling much better. The adenopathy and splenomegalia were less noticeable. The leukocytes numbered 7,800, with 68 per cent lymphocytes, most of which were still abnormal types.

On July 13 the count was 8,400, with 44 per cent lymphocytes; on July 20, 7,400, with 36 per cent lymphocytes; on July 27, 8,800, with 26 per cent lymphocytes.

The spleen and lymph glands had returned to normal size by this last date and he was then feeling fine.

By August 10 the white cells numbered 7,800 with 31 per cent lymphocytes, most of which were still of the abnormal type. On September 22 the count was 9,900, lymphocytes 32 per cent, with about the same number of abnormal types of cells, though they were not so striking as in former slides. By November 11 the leukocyte count was 9,400, with 30 per cent lymphocytes. There were still many of the abnormal lymphocytes seen, but more of the normal type were present. He felt well and seemed to be in perfect health. No evidence of nephritis was found at any time.

One of the most interesting points to me about the blood picture in this case is that although the first leukocyte count was normal, the morphological picture of the blood cells was not. If they had not been studied, the diagnosis might have been missed or at least delayed. Again, four months later the clinical picture and the leukocyte count

had returned to normal, so-called atypical "leukocytoid" lymphocytes being still present in the blood. The diagnosis of glandular fever was made from the typical clinical picture, and characteristic blood findings.

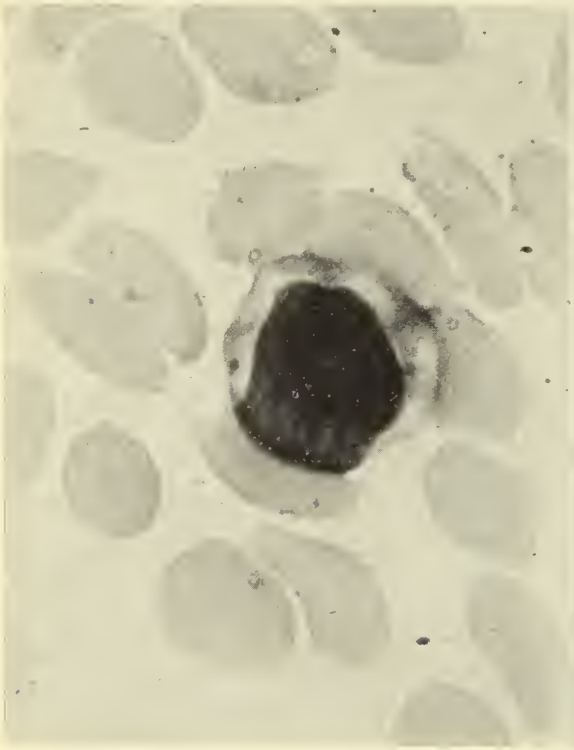


Fig. 4. This cell shows a smaller nucleus with more cytoplasm, the latter not so basophilic and containing many vacuoles. These cells resemble plasma cells, derived from a lymphocyte.



Fig. 5. A "leukocytoid" lymphocyte with two neutrophils showing two and three lobes to nuclei—Arneth's shift to left.

Glandular fever was first described by Pfeiffer[1] back in 1889, under the title of "Drusenfieber," but it was Tidy and Morley[15] (1921), Tidy and Daniel[14] (1921) and Downey and McKinlay[5] (1923), who established it as a clinical entity and accurately described the blood changes and clinical picture. It is evident from their writings that cases in the literature described as acute lymphadenosis, infective mononucleosis, acute benign leukemia, pseudo-leukemia and peculiar lymphoid reactions secondary to infection or sepsis are probably the same as glandular fever.

There are three groups or types of cases which have been reported. The first, one might describe as a miscellaneous group which seem to be peculiar or abnormal lymphatic reactions to infection or sepsis, such as reported by Turk,[16] Naegeli,[10] Herz,[7] Cross[4] and Cabot.[3] The second includes such cases as were first described by Pfeiffer,[11] occurring mostly in children, epidemic in nature, febrile, showing a red throat with nontender cervical glandular enlargement, and frequent abdominal pain, enlarged liver and spleen.

The third group occurs more often in young adults and corresponds with those cases reported by Tidy and Daniel,[14] Sprunt and Evans,[13] Bloedorn and Houghton,[2] Downey and McKinlay,[5] Longcope,[9] and more recently by Benson[1] in England, Lehndorff and Schwarz[8] in Vienna, and others. In these, the glandular enlargement is more likely to be general with a preceding upper respiratory infection and systemic reaction. The spleen is usually enlarged. There are no hemorrhages nor secondary anemia. A leukocytosis with relative lymphocytosis is characteristic. Slight reddening of fauces and tonsils is usually present without exudation. The glands usually appear about the third day and reach a maximum in one to three days with an accompanying fever of 101 to 103 degrees. The spleen and glands usually subside in five to fifteen days, but may relapse or remain palpable for several weeks or months. Suppuration is rare. The fever usually

subsides within a week or two but has been known to persist longer. Recovery is usually complete within fifteen to thirty days except for the adenopathy and the abnormal blood picture which persist for months.

The disease has recently been prevalent on the continent, as indicated by the reports of Benson[1] in Britain, Rolleston[12] in Germany, and Lehndorff and Schwarz[8] in Austria.

Downey's and McKinlay's[5] article published in 1923 brought the subject up to date at that time and included a complete bibliography. The clinical phase was well presented by McKinlay and the hematological side thoroughly and masterfully dealt with by Downey, including an excellent plate illustrating the various types of pathological lymphocytes.

Lehndorff and Schwarz[8] have published a very extensive article entitled "Drusenfieber," covering over a hundred pages, including a discussion of the entire literature up to 1932. They feel that glandular fever is epidemic chiefly in children. An incubation period of seven to eight days is followed by a prodromal stage, usually quite short but which may last two to four weeks, during which the patient has general malaise, loss of appetite, abdominal pain, fatigue, etc. Then the fever begins and from this point they distinguish six types: septic, anginal, pharyngeal, thoracic, abdominal, and mild. (Time will not allow me to deal with them individually. Their names are explanatory.) The glandular enlargement is distributed more or less according to these types, the cervical adenitis being the most common.

They find that splenomegaly is one of the symptoms of this disease. Other symptoms recorded are bronchitis, rhinitis, pharyngitis, tonsillitis, abdominal pain and colic, liver enlargement with or without icterus, and exanthemata.

The chief complication is nephritis. All types from a simple albuminuria to a fatal hemorrhagic nephritis have been reported. The circulatory system is not particularly affected other than is usual in general infection. The nervous system has only rarely been involved, and then chiefly the cerebrum and meninges as reported by Epstein and Domeshek.[6] It is interesting to note that the increase in the cells of the spinal fluid was similar to those in the blood, namely, lymphocytic (34 cells—30 lymphocytes).

The etiology of the disease is still unknown. The presence of spirochetes in the throats of many of the patients is not considered important or directly related.

Its differential diagnosis involves chiefly lymphatic leukemia from which it can always be distinguished by the morphological characteristics of the abnormal lymphocytes according to Downey.[5] The absence of anemia and purpura should help to distinguish it clinically. Tuberculosis, typhoid fever, Hodgkin's and other diseases involving the lymphatic system may simulate it at certain stages. Its complications may cause other diagnostic difficulties, namely, glomerular nephritis, encephalitis, etc.

Conclusion.—Matters of special importance for further study of glandular fever relate particularly to its etiology, diagnosis, and whether or not it is a definite disease entity, and, if so, with its mode of transmission, epidemiology and classification.

I acknowledge indebtedness to Dr. Hal Downey for his valuable advice in the study of the blood cells in this case.

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GASTRIC AND DUODENAL ULCER: RESULTS OF IMMUNIZATION TREATMENT*

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As a prelude to the main theme of my paper I would like to present a brief résumé of the experimental investigation of elective localibation of streptococci in ulcer, performed by Nickel and me in 1926 and 1927.

A series of gastric and of duodenal ulcers, and of gastrojejunal and other recurring ulcers was studied carefully from the standpoint of infection. Cultures were made of all available foci, and of the ulcers, if they were surgically resected. Part of each ulcer was kept for histopathologic study, as well as being stained for organisms by Rosenow's special technic. A green-producing, Gram-positive, diplostreptococcus was isolated in cultures from one or more foci of each patient with ulcer, except in those few instances in which foci had been completely eradicated previously. An organism of the same morphologic, cultural, and biologic characteristics was found in the resected ulcers, and could be demonstrated microscopically in the inflammatory zone surrounding the ulcer in all cases.

This diplococcus, isolated from either the focus or the ulcer of the patient, was capable of producing acute hemorrhagic erosions and shallow ulcers in 73 per cent of all animals inoculated, whereas streptococci isolated by Nickel in 138 cases of arthritis and inoculated in laboratory animals, produced lesions in the stomach or duodenum in only 5 per cent.

With the same organism foci of infection were artificially produced in devitalized teeth of healthy dogs, and resulted in the production in some of the animals of subacute and chronic forms of gastric ulcer in from one to six months. Likewise, the organism was demonstrated in the ulcer microscopically and culturally, and was recovered from the foci when injected into other animals; the recovered organism had the same selective activity as it originally had. Strains capable of the greatest selective activity were kept for the production of a stock vaccine, designated ulcer vaccine, prepared in the usual manner, and containing 2,000,000,000 attenuated organisms in each cubic centimeter.

The vaccine of the ulcer-producing streptococcus seems to have more than a non-specific protein effect. Commercial catarrhal and typhoid vaccines given to a series of eight patients who entered the hospital, for whom diets and medication were not controlling symptoms, gave no relief with, or after, a series of four to six injections, whereas symptoms were promptly relieved after two or three injections of the ulcer vaccine.

Injections of aolan and a commercial lipin-proteid compound with emetine, and which is marketed as Synadol, gave relief of symptoms temporarily in some cases but apparently no immunity. A series of six patients treated by my hospital colleagues, with diet, alkali and Synadol, all received temporary relief of symptoms, probably due to temporary relief of pylorospasm and of hypermotility, as noted by roentgenologic examination, but there was no change in the ulcer, and in all cases symptoms recurred in less than a year.

I will admit that, in the last decade, volumes have been written on the cause and treatment of peptic ulcer and it may seem superfluous to try to add anything to the vast array of literature, but the problem is far from being solved. There is considerable diversity of opinion in the conclusions of different clinical and experimental in-

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vestigators. In most instances the hypotheses as to cause and proposed methods of treatment are directed at some one of the physiologic functions that has become perverted consequent to the ulcer itself. Therefore, treatment affords little more than temporary and symptomatic relief.

Two attributes of ulcer stand out: one, their tendency to heal, especially if measures are directed against hyperacidity and pylorospasm, and the other, their tendency to recur.

In consideration of treatment, therefore, all effort must be made to effect a change in the perverted physiologic processes, and in all factors of a predisposing nature, but of prime importance is removal of the basic cause of the ulcer.

Recent investigations have shown the importance of the presence of adequate amounts of mucin; this substance is now to be regarded as an important constituent of gastric content. All the chemical and mechanical factors which operate in the presence of ulcer are probably of secondary importance in the cause of ulcer. The constitutional and neurogenic factors so often referred to as important in the etiology are probably entirely predisposing.

In the treatment of peptic ulcer, since 1927, more emphasis has been placed on what has been suspected as being an exciting etiologic agent; namely, a specific diplostreptococcus. Also, more emphasis has been given to removal of the source of the infection, when possible, as well as on trying to build up immunity by the use of ulcer vaccine.

The series of 154 cases of ulcer which were seen in my private practice and which form the basis of this report was observed and treated in the period from May, 1927, to May, 1931, inclusive. All patients treated since May, 1931, were not included, because no generalization could be drawn from so short a period of observation. Cases seen in charity hospitals and similar clinics were not included. In all cases that were included, a definite diagnosis of peptic ulcer was made and confirmed by roentgenologic and laboratory evidence; the history also was definite, and therapeutic tests were included.

There were 137 men and seventeen women, or a ratio of about 8:1. The average age for the group was thirty-eight and eight-tenths years. The youngest patient was twenty years of age and the oldest sixty-seven years, and the average duration of symptoms of ulcer was six and eight-tenths years. The history of shortest duration was one month, and that of longest duration, forty years. Ten patients had definite symptoms of ulcer of twenty or more years' duration.

The habits of living, considered by some as important contributory factors in production of ulcer, were carefully investigated, especially as regards irregularity of meals, and use of coffee, tobacco, and alcohol. In 35.7 per cent of cases all habits were good and in 64.3 per cent habits were considered bad. In a miscellaneous group of patients without ulcer, of corresponding age and ratio by sex, the habits of living of 58.2 per cent were bad. There was little difference between the habits of living of patients with ulcer and those without.

There was a history of influenza in 46.7 per cent of cases; of tonsillitis, in 22.4 per cent; of pneumonia, in 12.8 per cent; of appendicitis, in 12.8 per cent; of typhoid fever, in 7.4 per cent, and of rheumatic fever in 5.6 per cent. Two patients reported having had syphilitic infection, but it was not clinically active at the time of the investigation. One patient had tuberculosis, not active for many years, and one, acute catarrhal jaundice. In comparing an equal group of patients who did not have ulcer, the incidence of influenza was 48.1 per cent; of tonsillitis, 26.6 per cent; of pneumonia, 13.2 per cent; of appendicitis, 11.6 per cent; of typhoid fever, 11.4 per cent; of rheumatic fever, 2.8 per cent, and of syphilis, 3.5 per cent. Apparently such acute infections have no predisposing etiologic significance in ulcer but influenza is definitely known to aggravate symptoms of ulcer.

Only twelve of the 154 patients were free of clinical evidence that they harbored foci of infection on admission, but even they gave histories of removal of supposedly infected teeth or tonsils since onset of the symptoms of ulcer. Definite foci of infection were found in the tonsils in 71.9 per cent of the cases; in the teeth in 28.7 per cent; in the sinuses in 5.5 per cent, and in the prostate gland in 13.7 per cent. These percentages indicate that more than one of the structures concerned was infected in some cases. The incidence of foci of infection was ascertained among 120 patients of the same age and ratio by sex, who did not have ulcer, but who did have rheumatic arthritis, myositis, neuritis, recurring attacks of appendicitis or other diseases com-

monly attributed to focal infection; the tonsils were considered diseased in 53.4 per cent, the teeth in 26.7 per cent, the sinuses in 5.8 per cent and the prostate gland in 19.8 per cent.

Among the patients with duodenal ulcer, the average total acidity of gastric content was 60.2, and the average free acidity 45.3, in terms of cubic centimeters of normal sodium hydroxide. The highest total acidity was 98 and the highest free acidity, 74; the lowest total acidity was 25, and the lowest free acidity 15. The values for the patients with gastric ulcer were correspondingly lower. The average total acidity of gastric content was 51 and the average free acidity 38.8. The highest total acidity was 84 and the highest free acidity 69; the lowest total acidity was 15 and the lowest free acidity 5. The values for patients with gastrojejunal ulcer averaged, total acidity 43 and free acidity 31; the highest total acidity was 48 and the lowest free acidity 35; the lowest total acidity was 39 and the lowest free acidity 20.

In this group of 154 cases were 114 of duodenal ulcer, of which there was obstruction in thirteen and hemorrhage in three. There were also twenty cases of gastric ulcer, in two of which there was obstruction and in three hemorrhage. In thirteen cases of multiple ulcer, both gastric and duodenal, four of the ulcers were obstructing and three hemorrhagic. In seven cases of gastrojejunal ulcer, two were obstructing and one hemorrhagic.

The treatment was chiefly medical and consisted of a well-balanced bland diet, modified from the Sippy diet for ulcer that is recommended for the fourth week. The quantity and variety of food was gradually increased until the calories were sufficient for the patient to maintain weight and strength. Foods rich in vitamins A, B and C and in minerals were carefully retained in the diet. All patients were ambulatory except those markedly undernourished, or those with hemorrhage, obstruction, or slow perforation. The diet for the latter consisted of frequent regular feedings of liquid foods for the first few weeks. Alkaline powders, antispasmodic drugs and, when necessary, alkaline mineral oil and agar (Alkaline Petrolagar), were the only medications given orally. Instruction regarding hygiene, and a warning to avoid alcoholic beverages and tobacco, was given as a routine. When necessary, the stomach was aspirated nightly and lavage was continued until secretions at night were controlled.

Four patients were operated on without any serious attempt at medical treatment other than that usually given before operation. Three other patients had to be operated on because of recurrence of the ulcer, and because it was refractory to further medical treatment.

A serious attempt was made to remove all evident foci of infection of patients treated either surgically or medically; furthermore, to all patients who could and would take the ulcer vaccine, subcutaneous injections of it were given twice weekly; the dosage was started with 0.1 c.c. and was increased from 0.1 to 0.2 c.c. each injection, until 1 c.c. was reached, and this was continued for eight to ten consecutive weeks. The value of inoculations of ulcer vaccine is apparent, I believe, in the following case.

A man, aged thirty-six years, had had symptoms of ulcer for approximately eight years, and in the last two years had frequent, and at times severe, hemorrhages. Roentgenograms revealed a definite duodenal ulcer of the niche type. The patient was treated by a competent physician, with regular Sippy diet, powders, antispasmodic drugs and rest in bed for varying periods of time; the tonsils and two abscessed teeth were removed. Because of inability to control the symptoms of ulcer and the acute attacks of pain that occurred in the abdomen at times, with severe hemorrhage, exploration was advised. At operation a definitely diseased appendix, a chronically infected gallbladder without stones, and a duodenal ulcer on the posterior wall of the cap were found. The surgeon deemed it more advisable to remove the diseased appendix and gallbladder and leave the ulcer, which he thought would now heal following medical treatment. For two months after the patient left the hospital there was no gastric distress. Then, in spite of careful diet, alkalization, and rest in bed, the symptoms of ulcer recurred, and melena occurred about every ten days to two weeks. The patient was referred to me by his attending physician. Without any change in the previous treatment, inoculations of ulcer vaccine were given twice a week for ten weeks. All symptoms of ulcer rapidly subsided and no further hemorrhage occurred. Follow-up roentgenograms revealed that the niche in the duodenum had disappeared and there has been no recurrence of symptoms for the last three years.

RESULTS OF TREATMENT

In 1927 sixteen cases of ulcer were treated. In seven, treatment was by means of diet, alkaline powders, antispasmodic drugs, gastric aspiration and lavage. Two of the seven patients had all foci removed and one suffered recurrence of

symptoms of ulcer about a year later. The other five of the seven did not have foci removed and four of the five suffered recurrences in eight to eighteen months. Eight patients received, in addition to the usual medical regimen, inoculations with ulcer vaccine. Six of these had all foci removed, without recurrence of ulcer to date. Two of the eight did not have the foci removed, and the ulcer did not recur. One patient with a hemorrhagic ulcer was treated surgically and died following operation.

In 1928, thirty-one cases of ulcer were treated. Gastroenterostomy, without any serious attempt at medical treatment, was performed on one patient who had a bleeding gastric ulcer, and a definitely diseased appendix was removed; the ulcer has not recurred. Of the patients on the usual medical regimen, only four had foci removed and two of the four suffered recurrence of the ulcer. Three of the thirty-one did not have foci removed and ulcers of all recurred in eighteen months or less; of these, one patient was treated surgically, by gastro-enterostomy and removal of foci, without recurrence to date. Fourteen patients received ulcer vaccine and had foci removed, and in none have the ulcers recurred. Nine patients received ulcer vaccine, but as foci were not eradicated, one suffered a recurrence of ulcer two years later.

In 1929, forty-nine cases of ulcer were treated. One patient was operated on primarily because of a slowly perforating and obstructing duodenal ulcer; gastro-enterostomy was performed and a chronically diseased gallbladder was removed without recurrence of the ulcer. Of those patients for whom only the usual medical regimen was prescribed, eight had foci removed, and the ulcers of three of the eight recurred in one to two years. Seven patients of the forty-nine did not have foci removed and the ulcers of five of them recurred in ten to eighteen months. Twenty patients of the forty-nine received inoculations of ulcer vaccine and foci were eradicated. The ulcer of one patient of the twenty recurred and operation was performed one year following treatment; it recurred a second time and operation was performed again; the ulcer was resected and a posterior Polya type of resection was performed. The patient had a recurrence of the ulcer again this summer (1932). Thirteen patients were inoculated with ulcer vaccine but did not have foci removed; the ulcers of three of the thirteen recurred two to two and a half years later.

In 1930, thirty-six cases of ulcer were treated. Two patients received only the usual medical regimen and had foci removed; the ulcer of one patient recurred at the end of eleven months. Gastro-enterostomy was performed on one patient with obstructing duodenal ulcer. The remaining thirty-three patients received, in addition, inoculations of ulcer vaccine; twenty-two of the thirty-three had all foci eradicated but ulcer of one patient recurred thirteen months after a severe attack of influenza. Eleven patients of the thirty-three did not have the foci eradicated and the ulcers of two recurred; one patient was operated on eighteen months after medical treatment.

In 1931, twenty-two cases of ulcer were treated. Of these patients who received only the usual medical regimen, two patients had foci removed and ulcer of one of the two recurred in one year. One patient of the twenty-two did not have foci eradicated, and ulcer recurred six months later. Of those who received inoculations with ulcer vaccine in addition to the usual medical care, nine patients had the foci removed and ulcer has not recurred. Ten patients did not have foci removed, and ulcer of two of the ten recurred ten and fifteen months later, respectively.

Of the entire group of 154 patients with ulcer in my private practice in the period of four years, 116 were treated with the stock ulcer vaccine in addition to diet and oral medication. Seventy-one of this group had all evident foci of infection removed, and ulcer of two only has recurred, an incidence of 2.8 per cent. Forty-five of the 116 patient received inoculations of ulcer vaccine but did not have all foci eradicated, and the ulcers of eight (17.8 per cent of forty-five) recurred in from one to three years. Thirty-four patients of the 154 did not receive inoculations of ulcer vaccine in addition to the usual regimen for ulcer but eighteen of the thirty-four had all evident foci of infection removed, and the ulcers of eight (44.4 per cent of the eighteen) have recurred to date. Among the sixteen patients of the thirty-four who did not have foci completely eradicated, the ulcers of thirteen (81 per cent of sixteen) recurred. Four patients of the 154 received surgical treatment only.

The clinical results in this series of cases of

ulcer seem to demonstrate that ulcer vaccine and removal of foci of infection are two indispensable adjuncts to the usual dietetic and hygienic measures, and offer more successful means of combating this chronic and recurring malady.

The series of cases is not large enough and the element of time is too short to draw any definite conclusions, but two deductions can be made: (1) that foci of infection seem to play an important part in the production of ulcer, and (2) that immunity, at least for a time, can be obtained by the use of vaccine made from streptococci obtained from ulcers of human beings, and having definite localizing properties when inoculated in animals. This would seem to substantiate the opinions long held by Rosenow.

Time and further effort will tell more, and fancy will give way to facts. There is still much to be learned from the careful correlation of clinical and laboratory data.

MEDICAL ARTS BUILDING.

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USE OF MUCIN IN THE TREATMENT OF PEPTIC ULCER*

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ALTHOUGH it has been demonstrated that mucin is of no definite value in the treatment of some cases of peptic ulcer, one should not be too ready to discourage its use. Undoubtedly mucin does have definite value in the treatment of some cases of benign ulcer of the stomach or duodenum, but it remains to be determined in which cases it can be used with the expectation of obtaining not only relief from symptoms but cure of the disease.

One of the important factors in most types of treatment of peptic ulcer, whether surgical or medical, seems to be reduction of gastric acidity. The more successful an operation is in accomplishing changes in the physiologic functions of the stomach, including reduction of acidity, the more successful it seems to be in permanently curing peptic ulcer. Gastro-enterostomy usually materially changes gastric chemical factors, and probably because of this it is frequently successful in accomplishing cure of peptic ulceration. In carrying out nonsurgical treatment, the effort has been to accomplish reduction of gastric acids mainly by use of bland diet and alkalies. Objection to the use of alkalies has arisen because ocsionally such use is followed by excessive secretory activity of the gastric glands. It is then difficult to control acidity satisfactorily, and the immoderate increase of alkalies to accomplish neutralization occasionally will result in toxic symptoms. Hardt and Rivers have shown that in 17 per cent of cases, following the Sippy regimen for treatment of peptic ulcer, signs of alkalemia developed. It is well known that certain patients tolerate alkalies poorly, particularly old people, and if there is any associated hepatic or renal disease; in such cases it may be extremely dangerous to advise the use of large amounts of alkalies. Recent experiments have led us to believe that among patients with advanced renal, and perhaps hepatic disease as well, it may be dangerous to use mucin indiscriminately.

There is still some uncertainty regarding the intimate mechanisms responsible for regulation of acidity of the stomach. Why the concentration of acid in the stomachs of certain persons seems to be persistently high, why in others the peak of acid secretion seems to be decidedly lower,

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whether the acid secreted by the gastric glands is poured forth in the same concentration under all conditions, or whether there is fluctuation in the concentration of the acid, remain undetermined; nor is it known exactly how significant the factor of duodenal regurgitation may be. It seems to be the consensus of opinion, however, that the mucus secreted by the gastric glands has something to do with regulation of acidity of the gastric content.

The mucous membrane of the stomach and duodenum, as well as of other portions of the alimentary tract, secretes mucus. It has been pointed out that local chemical and mechanical factors are largely responsible for its secretion. Excessive stimulation of nerves also will result in production of some mucus, although Fogelson and Ivy are of the opinion that this is of no great significance. Mucus in the stomach seems to have multiple functions, of which lubrication probably is one. Also, it may have some protective action for the gastric mucosa. Whitlow and Ivy suggested, "The mucus-containing cells of the gastric epithelium are the last layer of gastric wall to be digested by gastric juice . . . HCl-pepsin diffuses slowly through a film of mucus. . . . If the mucus film covering the mucosa of the pyloric antrum is wiped away, N/10 HCl application causes bleeding much sooner than otherwise." There seems, thus, to be some evidence that the adhesion of the viscid mucus to gastro-intestinal mucosa does protect, to a certain degree at least, these surfaces.

Control of gastric acidity, although possibly of minor significance, seems to be another of the numerous functions of gastric mucus. Mitchell suggested that mucus inhibits the proteolytic action of gastric juice "by a combined neutralizing, diluting, and buffering action." Heidenhain, in 1879, suggested that gastric mucus played some part in certain phases of neutralization of acid in the stomach. Pavlov, in 1910, maintained that the gastric mucus was responsible for certain fluctuations in acidity observed in the gastric secretion of pouches made from a dog's stomach. Kaufmann, in 1908, began using silver nitrate in the treatment of peptic ulcer, assuming that this substance produced an outflow of gastric mucus which favored the healing of ulcer. This method of treatment was soon discarded because of the development of numerous cases of argyria.

Recently Fogelson, on the assumption that gastric mucus was one of the substances which was intended by nature to regulate gastric acidity, suggested the feeding of mucus in order to lower the concentration of acid in gastric content. He prepared mucin from the mucosa of hogs' stomach and was able to show that this material would reduce acidity in the stomach of experimental animals. He felt that it might be applied in the treatment of peptic ulcer of human beings, and suggested that gastric mucus is an ideal antacid because: "(a) it combines readily with the free acid, (b) it is a natural substance which plays normally a protective, soothing, and lubricating rôle in the functioning of mucous membranes, and (c) its secretion or ingestion causes no chemical disturbances in the body and no unfavorable effect on gastro-intestinal secretory or motor activity." He reported the results of the use of mucin in a series of twelve cases of peptic ulcer, and maintained that there was definite improvement in symptoms. He further intimated that the relief from symptoms consequent to administration of mucin was due to two factors: "The mucin coated the ulcer and protected it against the proteolytic action of the gastric secretion, . . . through its high combining power with free acid it united with enough hydrochloric acid not only to neutralize the corrosive action of the gastric juice but to prolong the rate of dialysis of pepsin through the protective mucin layer."

In an unpublished article, Fogelson and Ivy reported further excellent results in the treatment of peptic ulcer with gastric mucin. They stated: "Gastric mucin controlled the symptoms in 101 out of 110 intractable ulcer patients. . . . No failure has been encountered in eighteen cases of acute massive hemorrhage treated with mucin. . . . In more than 450 peptic ulcer patients which included 110 intractable ulcer patients not responding to any other types of therapy, we were able to give complete subjective relief to over 90 per cent in from one to two weeks, with complete economic restoration." Atkinson, and Brown, Cromer, Jenkinson and Gilbert have brought forward additional evidence suggesting the efficacy of mucin in the treatment of peptic ulcer.

From Fogelson and Ivy's results it would appear that mucin has definite value in the treat-

ment of peptic ulcer, although the termination of symptoms must not make one too optimistic regarding permanent curative results.

We have used mucin in more than 150 cases of peptic ulcer. After several doses some of the patients refused it because of the objectionable taste or because it made them definitely more uncomfortable. A few of them were nauseated, and vomiting and diarrhea followed. In other cases symptoms were not controlled, and in such cases usually gastric acidity was not materially reduced.

We have recently reported on the discovery of a powerful secretagogue, probably histamine, in certain preparations of mucin. The product is now better standardized and seems to be practically free from this objectionable substance. It must not be assumed, however, that the commercial product which is now being marketed is pure mucin. Mucin is only one of its constituents. Liberal amounts of peptones are known to be present, and probably are chiefly responsible for the neutralization of acid. The various components of the product should be better understood before it can be used with confidence. We have recently noted elevations of the value for blood urea of certain patients with duodenal ulcer and associated renal disease who were given 60 to 80 gm. of mucin daily. Discontinuing the mucin would promptly be followed by return of urea to normal values. Whether these changes in the values for urea of certain patients were the result of the addition of very appreciable amounts of proteins included in the products of mucin now used, or whether they were caused by some specific toxin, has not been satisfactorily established as yet. It should also be stated here that among patients with duodenal ulcer and associated biliary disease at times signs of definite toxemia seem to develop, the nature of which is at present being investigated.

In certain cases mucin was used without particular regard to dietetic restrictions; in others it was used with a bland diet, and in still others in conjunction with small amounts of alkali. We soon found that it seems to be most beneficial when combined with other approved methods of treatment, such as a nonstimulating diet, sedatives, and a small amount of alkali.

It is our practice now to hospitalize patients during the periods when the ulcers are definitely active, and to place them on a regimen similar to that instituted by Sippy, but using less alkali. Milk is given every hour. At 10:30 a. m., 4:30 p. m. and 7:30 p. m., 30 gm. of mucin is substituted for the usual hourly dose of alkali. The amount of alkali used varies, but seldom exceeds 120 grains (7 to 8 gm.) daily. After three or four days this regimen is modified; the patients are permitted to spend part of their time out of bed, and a more liberal diet, consisting of puréed vegetables, cereals, and various bland foods is prescribed. Instead of taking milk hourly they take it twice between meals. Alkalies are taken three times daily, 12 to 15 grains (0.8 to 1 gm.) of soda, bismuth, or magnesia one hour after meals, and mucin is taken an hour before meals and at 10:00 p. m., in doses of 20 to 25 gm. After three or four days on this diet an ambulatory regimen is substituted. The diet is limited to bland foods. Milk is given once between meals, and 10 or 15 grains (0.65 or 1 gm.) of alkali may be used an hour after each meal. Mucin is given an hour before the meal and before the patient retires; 60 to 70 gm. is used daily. Throughout the treatment patients are encouraged to get as much rest and relaxation as possible, and this is facilitated by means of liberal amounts of sedatives, such as bromides and the barbiturates. Usually atropine is combined with the other drugs.

Our dietitians have attempted to disguise the unpleasant taste of mucin by various combinations, none of which has been entirely successful. The method which seems fairly satisfactory is to dissolve 20 or 25 gm. of the powder in several ounces of warm water, stir thoroughly with an egg beater, and add 2 or 3 ounces (60 or 90 c.c.) of milk or malted milk flavored to suit the individual taste.

About 50 per cent of our patients responded favorably when mucin was employed in their treatment. We are therefore encouraged to continue its use, and we hope to ascertain, if possible, the types of cases in which good results may be expected. We believe, however, that in the presence of complications, such as obstruction, repeated gross hemorrhages, and evidence of malignancy or penetration, or if nonsurgical methods have proved of no avail, treatment will be more safely and satisfactorily carried out by operative measures. The remaining cases may arbitrarily be divided into two groups.

In the first group are cases in which local

changes in tissue seem of chief significance. As an illustration might be cited the case of a child aged five years who recently came under our observation. During an acute attack of tonsillitis, severe indigestion developed and large amounts of blood were passed by bowel. Roentgenograms revealed the presence of a duodenal ulcer. Infected material from the removed tonsils, when injected intravenously in experimental animals, produced hemorrhagic gastro-intestinal lesions. The use of mucin in this type of case, in conjunction with removal of foci of infection and other approved methods of treatment, would seem to be an ideal procedure in hastening healing. In this group, also, are acute ulcers, shallow mucosal erosions, gastritis, duodenitis, and gastrojejunitis with or without associated ulcer, and chronic ulcer with intervals of exacerbation of symptoms which suggest an acute or subacute condition. In these cases there is a shifting of pain from the midepigastrium to the upper right abdominal quadrant, with local tissue reaction as evidenced by tenderness. Mucin might conceivably be of definite value in such cases, when local measures of protection are obviously desirable.

In the second group of cases systemic factors, especially those arising from a disturbed nervous system, seem of greatest significance. The patients are of the astute, intensive, high-strung type. During periods of fatigue, tension, and unusual worry, exacerbations of symptoms develop. These episodes arise with surprising rapidity following some unpleasant experience, and they may disappear with equal celerity. It is debatable whether such episodes always indicate activity of the ulcer, because similar types of patients under similar conditions not infrequently have similar syndromes, even though at operation ulcer is not demonstrable. Mechanical and chemical changes in the stomach, the result of nervous imbalance, may be responsible for the symptoms in these cases, and incidentally may be the factor which reactivates such ulcers at intervals. Giving mucin may be of value in these cases, but it seems reasonable that treatment directed toward systemic and especially nervous factors would be even more valuable. Readjustment of the activities of the patients, a more sane program of living, more rest, more relaxation, large amounts of sedatives, and a bland diet would appear to be more essential than a substance which, after all, can be expected to exercise only a local action on gastroduodenal tissues.

CONCLUSIONS

Mucin, although probably of great benefit in the treatment of certain types of peptic ulcer, is not a panacea for the disease, nor is it in our opinion an adequate substitute for other approved methods of treatment. When attempting evaluation of its therapeutic worth it must be recalled that cessation of symptoms does not guarantee cure of ulcer.

The use of mucin for the treatment of peptic ulcer associated with disease of the urinary or biliary tract must be carried out with great caution because untoward effects may result from indiscriminate use of mucin in such cases.

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MULTIPLE MYELOMA*

PRECIPITATION OF BENCE-JONES PROTEIN IN THE BLOOD

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MULTIPLE myeloma is not often seen in general practice, but because of the vagueness of the early symptoms, the lack of adequate laboratory and x-ray examinations, and the failure of the physician to suspect its presence when the patient has such vague complaints as lumbago, rheumatism, girdle pains, or neuralgia, a number of cases go undiagnosed, or the diagnosis is delayed until late manifestations of the disease make it obvious.

It is interesting to note that quite often the presence of multiple myeloma is suggested by some incidental laboratory finding, as the discovery of Bence-Jones protein in the urine (which occurs in about 50 per cent of the cases). For example, Short and Crawford report the precipitation of Bence-Jones protein in a patient's serum which was being heated at 56° C. in a Wassermann inactivating bath. This accidental finding resulted in the patient's being submitted to a complete x-ray examination, which showed the typical picture of multiple myeloma.

Recently, we had the opportunity to observe a case of multiple myeloma, and made some interesting observations on the blood chemistry of the patient.

CASE REPORT

T. W. S., aged sixty-three, unmarried, was admitted to the hospital on September 5, 1932. His illness had begun the previous March, when he came down with a bad cold, had a non-productive cough, slight fever, and a general soreness over the front and sides of the chest. The pain in the chest was not influenced by deep respiration or by cough. During the next few weeks he felt better, but the soreness in his chest never left him. In May he began to complain of lumbago. He had dull aching sensations over the upper part of his spine, which were increased by exertion. He tried several home remedies, but these gave him no relief. During the summer, the soreness in his spine and in his chest slowly but progressively increased, and about a month before admission to the hospital he had begun to notice some tenderness in his scalp. There were no pains in the upper or lower extremities, and no loss of appetite. There was also no history of bleeding from the nose, mouth, or bowel, and no history of urinary disturbances. Two weeks previously he had consulted his family physician and was told that the backache was due to kidney trouble.

Physical examination.—The patient was a well developed and well nourished elderly white male. There was not much evidence of loss in weight. His temperature was 97.8°; pulse 90. He appeared somewhat slow in his mental reactions and gave the impression of being drowsy and apathetic, although he was perfectly rational. A number of small irregular nodules could be felt under the scalp in the occipital and parietal regions. The pupils reacted normally to light and accommodation. There were small lumps present on the lower ribs. The lungs were normal. The heart was not enlarged and there were no murmurs. The blood pressure was 145/90. No tenderness, rigidity or spasm was found in the abdomen. No abdominal masses were palpable and the liver and spleen were not enlarged. The extremities showed no significant findings although the patellar, biceps, and triceps reflexes were a trifle sluggish. There were no disturbances of sensation. Rectal examination revealed moderate uniform enlargement of the prostate.

Laboratory findings.—Urine—specific gravity, 1.012; albumin, trace; many hyaline casts; occasional pus cell; Bence-Jones protein present. Blood—hemoglobin, 48 per cent; erythrocytes, 3,100,000; leukocytes, 8,400. Blood urea, 128 mgs. per 100 c.c. Blood Wassermann, negative; Kahn, negative.

During the course of the routine examination a determination of the blood urea was done, the mercury combining-power method described by Hench and Aldrich being used. In this method the blood is coagulated with trichloracetic acid. When this was done and the mixture centrifuged, a fine milky white precipitate formed in the tube just above the layer of blood cells. This had never occurred in any of the previous tests we had done by this method, and we were unable to find any mention of it in the literature covering the test. The unknown precipitate was almost equal in volume to the layer of blood cells. To eliminate the possibility of faulty reagents as a cause for the unusual precipitation, the test was repeated with the same reagents on the blood or other patients, but no white precipitate formed. Personal communication with Dr. Hench informed us that this precipitate had not been previously observed by him.

The presence of Bence-Jones protein in the urine led us to suspect that this new precipitate might be Bence-Jones protein which had been precipitated from the patient's blood by the trichloracetic acid. Oxalated whole blood was treated with trichloracetic acid and

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centrifuged. The top layer of clear serum was removed, leaving the upper layer of the white precipitate and the lower layer of blood cells. The white precipitate was removed, washed with trichloracetic acid and again centrifuged. The acid was then decanted, and distilled water added to the precipitate. Heating caused

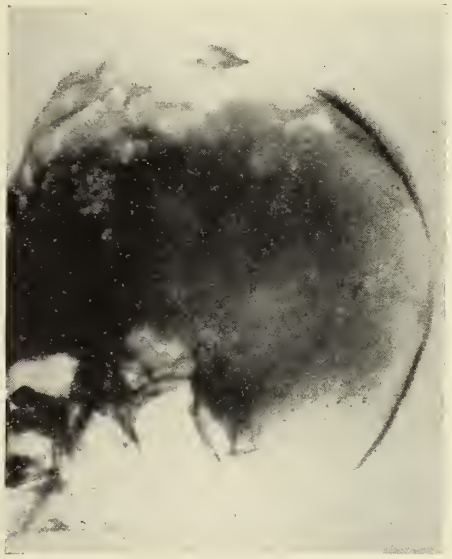


Fig. 1. X-ray of skull.

the precipitate to dissolve completely, but there was no return of cloudiness when the solution was cooled. To determine whether Bence-Jones protein was present in the clear solution two tests were done:

1. To 1 c.c. of the clear fluid were added three drops of sulphosalicylic acid. The solution became cloudy at room temperature, the cloudiness disappeared on boiling, and returned when the solution was cooled.

2. To five parts of the clear solution one part of 50 per cent acetic acid was added. This caused no visible reaction. To this, at room temperature, were added three parts of saturated solution of sodium chloride, which produced a cloudiness in the solution. The cloudiness cleared on boiling, and returned faintly when the solution was cooled.

We found, also, that the blood serum of this patient clouded when heated in a water bath at 56° C.

On x-ray examination of the thorax, spine, and skull, there were multiple spherical punched-out areas typical of multiple myeloma. The patient did not respond to x-ray therapy and died October 30, 1932. Autopsy confirmed the diagnosis of multiple myeloma.

The mercury combining-power method of determining blood urea, being a relatively simple method which can be done with a minimum expenditure of time and does not require an elaborate outlay of apparatus, is used frequently. Many physicians who do not have special laboratory facilities available use a commercial outfit in their offices. It is our belief that if the unusual phenomenon, described in this article, occurs when the test is being done, further examination should be made to discover the cause of this unusual manifestation, and the possibility of multiple myeloma should be borne in mind.

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SOME CLINICAL ASPECTS OF SPINAL INJURIES*

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FRACTURES of the vertebra with or without dislocation are the most common results of severe injury to the spinal column. The vertebral column forms a bony protection for the spinal cord, which extends from the lower edge of the foramen magnum to the lower border of the body of the first lumbar vertebra and the whole range of spinal nerves are given off in this length so that in the intraspinal course of the nerve roots from above downwards there is an increasing obliquity, greatest in the region of the cauda equina.

The most severe spinal injuries are those in which the spinal nerves or cord are injured. The spinal nerves are likely to be damaged in the intervertebral foramina and the cord in the vertebral canal. The canal is larger in the cervical, lumbar and sacral regions and smaller in the thoracic portion and it is this region in which spinal cord injuries are commonly severe.

The vertebra may be injured by direct violence,

*Presented at the annual meeting of the Minnesota State Medical Association, St. Paul, May 24, 1932.

CASE RECORDS

Case No.	Age	Sex	Etiology	Fracture	Dislocation	Paralysis	Therapy	Results	Post-mortem
1	25	M	Struck by auto	None	None	Complete at level of 6th dorsal	Expectant	Improving	
2	61	M	Struck by auto	Depressed skull fracture None of spine	None	Present	Elevation of skull None of spine	Died	Transverse myelitis 4th thoracic segment
3	54	M	Auto accident	Pedicle 4th cervical	3rd on 4th cervical	Present	Expectant	Improving	
4	36	M	Struck by auto	Spinous process 4th, 5th, 6th cervical	6th on 7th cervical	Present	Collar Patient unconscious Operation	Paralysis gone Left under protest	
5	22	F	Auto accident	Spinous process 7th cervical Compound 7th and 9th dorsal	None	None	Expectant Stiff bed Taylor brace	Improved rapidly	
6	19	M	Auto accident	Rami of 2nd cervical	2nd on 3rd cervical	None	Expectant	Developed pneumonia; recovered	
7	44	M	Kicked in fight	Compression fracture 7th cervical	6th on 7th cervical Kyphosis	Present	Expectant	Died	Transverse traumatic myelitis with crushing of 6th and 7th cervical
8	75	M	Struck by auto	Fracture of spine and lamina of atlas	None	None	Expectant	Improved	
9	26	M	Auto accident	Compression fracture 12th dorsal	None	None	Expectant Brace advised	Improved	
10	27	M	Fall 12 feet	1st lumbar	None	Present	Laminectomy elsewhere	Partial return, now stationary	
11	7	F	Struck by auto	Spinous process 10th dorsal	10th on 11th dorsal	None	Hyperextension on frame	Improved	
12	46	M	Fall	Compression fracture 7th and 12th dorsal	None	None	Expectant	Improved	
13	38	F	Fall 10 feet	Compression fracture of 12th dorsal Kyphosis	None	Present Transverse Myelitis	Bradford frame	Died	No autopsy
14	75	M	Fall 12 feet	Compound fracture 12th dorsal	None	None	Hyperextension Body cast	Improving Is up and about	

15	12	M	Bullet wound	Bullet passed to side of 12th dorsal	None	Present Transverse Myelitis	Splenectomy Laminectomy	Retrogressive Died 4-27-32	No autopsy
16	15	F	Toboggan accident	Compression fracture 4th lumbar	4th on 5th lumbar Posterior	None	Hyperextension Body cast Taylor brace	Improved	
17	74	M	Fall 5 feet	Compression fracture 1st lumbar	None	None	Body cast	Improved Left under protest	
18	50	M	Fall 15 feet	Compression comminuted fracture 2nd lumbar Compression fracture 4th lumbar	3rd lumbar on 4th lumbar 4th laterally	None	Hyperextension Body cast	Improved	
19	26	M	Fall 15 feet	Compression fracture 2nd lumbar	None	None	Body cast Taylor brace	Improved	
20	51	M	Fall 25 feet	Compression fracture 2nd lumbar Kyphosis	None	None	Hyperextension Body cast	Improved	
21	55	M	Auto accident	Compression fracture 1st lumbar	None	None	Hyperextension Body cast	Improved	
22	16	F	Toboggan accident	Compression fracture 1st lumbar	None	None	Hyperextension Body cast Taylor brace	Improved	
23	23	F	Toboggan accident	Compression comminuted fracture 1st lumbar	None	Present	Hyperextension	No improvement	
24	30	F	Auto accident	Compression comminuted fracture 1st lumbar	None	Present	Laminectomy 13 years ago	Some improvement Stationary for years	
25	55	F	Fall 3 feet	Compression fracture 1st lumbar	None	None	Taylor brace	Complete recovery	
26	17	F	Struck by auto	Compression fracture 2nd lumbar	None	None	Hyperextension Body cast Taylor brace	Improved	
27	45	M	Auto accident	Spinous process 5th, 6th, 7th cervical Compression fracture 7th cervical	None	Complete of all extremities Transverse Myelitis	Extension	Died 23 hours after accident	Transverse myelitis cervical cord
28	20	F	Auto accident	Compression fracture 7th dorsal	None	None	None	Improved	

causing fracture of the arches of the vertebra. They may be injured by indirect force, such as a fall on the head or buttocks, thus causing a crushing of the bodies of the vertebra. They may be injured by forced flexion or extension of the spine, causing a dislocation with or without an accompanying fracture of the bodies and articular processes of the vertebra. A dislocation without fracture may occur in the cervical region but is rare in other regions of the spine.

Damage to the spinal nerves or cord may result from the above lesions through laceration, contusion, hematoma or destruction from compression. The anatomical effect of such trauma is evidenced by the physical signs presented.

Complete interruption of the cord results in loss of function below the level of the injury. Many injuries cause incomplete functional involvement though at the onset it may appear to be complete. Patients suffering an incomplete lesion and affording some hope of recovery, often do not have a complete sensory loss. It is stated that in general the motor paths are more sensitive to injury and more easily show loss of function as a result of pressure. In the immediately complete lesions little hope can be held out for any recovery. When there has been an injury so severe as to cause destruction of the cord no regeneration is possible. This is not true, however, of the cauda equina as here peripheral regeneration is possible.

The nature of the injury may often be elicited by careful physical examination. In cervical dislocations the head is turned to the side opposite the injury. In compressed fractures and a majority of fracture dislocations there is angulation of the vertebral column with a prominence of the spinous processes. There may be an irregularity with lateral displacement of one spine on another. When evaluating the importance of these signs it must be borne in mind that particuularly in the thoracic region irregularities of palpable parts of spinous processes may be normal. Great caution must be exercised when examining for a localized limitation of motion in case a fracture is suspected, as injury to the cord may be increased or actually produced by too thorough an investigation of movement.

A careful physical examination without radiographic aid often fails to detect a spinal injury without cord damage. The X-ray is of invaluable assistance in determining the extent of the bony lesion in these cases. The studies must be carefully made and expert interpretation is of utmost importance.

In all cases in which there is any evidence of central nervous system involvement a competent neurological examination should be made and a very exact record kept of the findings. Future examinations can then be checked against these original findings and the progress of the case closely followed.

The term "broken back" always carries with it the impression that we are dealing with a very grave and often fatal condition. There are, however, many cases of severe spinal injury that do not have any involvement of the central nervous system and under proper management make a good recovery. It is also frequently observed that cases receiving a comparatively minor injury have spinal cord involvement. It seems that in the past few years there have been an increasing number of spinal injuries and this is undoubtedly due largely to the increased number of automobile accidents.

When there is the slightest suspicion of spinal injury a careful investigation should be made to ascertain the presence or absence of disturbance of the structure of the vertebral column. In the cases that have obvious involvement of the central nervous system one will usually find some accompanying bone lesion. Again a spine may appear normal upon thorough X-ray investigation and the patient be suffering from a complete transverse myelitis.

I wish to present a summary of twenty-eight cases, all but one of which came under my observation during the past three years and all but three of which were treated at the Ancker Hospital, Saint Paul.

The solution of any medical problem requires first a correct diagnosis and then there is little difficulty in carrying out suitable treatment.

There is considerable difference of opinion regarding the treatment of spinal injuries, especially if there is any damage to the nerve elements; but nearly all are agreed that given a case of spinal injury with evidence of immediate complete transverse myelitis, no surgical interference is indicated.

The fact that spinal injuries do not call for emergency surgery is of great importance. It is impossible to determine the extent of the injury to the nerve elements until the period of

SUMMARY OF CASES

Etiology		Injuries		Treatment Received	
Fall	9	Fracture	26	Operated	3
Auto Accident	8	Fracture and Dislocation	7	Hyper-extension Cast & Brace	14
Direct Violence (struck by car)	7	Dislocation	0	Expectant	8
Toboggan Accident	3	No Fracture or Dislocation	2	Extensions	2
Bullet Wound	1	Paralysis	11	No Treatment	1
		Improvement	22		
		No Improvement	1		
		Died	5		

spinal shock has passed. This may last from a few hours to several days and operation undertaken during this period is attended by a high mortality.

Exploration is justified in cases in which one does not find complete paralysis but finds some evidence of conductivity remaining. In such a case a bony fragment may be found encroaching on the canal.

In compression fractures without paralysis, an attempt should be made to correct the deformity by hyperextension. After eight to twelve weeks the patient may be fitted with a proper brace and become ambulatory.

Unilateral dislocations without cord injury are susceptible to reduction. This is done under anesthesia by a combination of traction on the legs and head accompanied by gentle manipulation. Attempts at reduction should be made as soon as possible.

In cases when there is paralysis, especially of the bladder and rectum, very competent nursing is necessary and this should be closely supervised by the attending surgeon. Special attention must be directed towards the care of the urinary bladder in order to avoid, as far as possible, the development of a severe cystitis. When catheterization must be resorted to the bladder should be irrigated with a saturated boric solution and this should be followed with instillation of a mild antiseptic solution.

Incontinence of feces requires mild laxatives and a cleansing enema daily.

All possible effort should be made to prevent decubitus. The position of the patient should be changed as frequently as possible. This avoids pressure being exerted too long on any particular area. The skin should be given careful attention through regular bathing and the application of alcohol and powders.

In conclusion I wish to emphasize three points:

1. Careful physical and X-ray examination in all cases of suspected injury to the vertebral column.

2. Spinal injuries are not surgical emergencies.

3. Operation is contra-indicated in cases suffering immediate complete transverse myelitis.

THE HUMAN FOOT: FUNCTIONAL DEVELOPMENT AND WEAKNESSES*

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DARWIN'S theory that man originated from the same ancestral stock as the great ape is generally accepted. The primates, the highest order of mammals, were the descendants of small, terrestrial quadrupeds who adopted an arboreal life probably for protection. Their hind feet were characterized by long digits and short metatarsal bones with divergent halluces; feet suited for a secure, clutching grasp. As they developed the ability to run about in the trees, a keen sense of equilibrium was acquired, the creatures balancing themselves on the distal ends of the middle metatarsal bones. These bones be-

*From the Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minnesota. Read before the Alumni Association of the University of Minnesota Medical School, Minneapolis, October 28, 1932.

came longer, the hallux lost some of its divergence, and the fourth and fifth digits became less prominent. The improved ability to maintain balance enabled them to squat when not in motion, a distinct advantage.

With the ability to range farther for food there came an increase in size of certain of these primates, and with it a basic alteration in the foot. The line of leverage of the foot became transferred from the third metatarsal bone and digit to a line between the first and second metatarsal bones. This latter line is called the "humanoid" line in contradistinction to the "primate" line, that extending through the third metatarsal bone. With its establishment the head of the second metatarsal bone became more important and extended beyond the head of the third.

As the centuries rolled on and the hind feet improved in their balancing and locomotive properties, the mode of locomotion changed. The hind feet were used chiefly as supports, and movement was accomplished mainly by swinging with the upper limbs, called by Sir Arthur Keith "brachiation." The semierect position seen in the modern anthropoid apes is probably due to the overdevelopment with consequent overweight of the upper extremities, due to brachiation. An important but little appreciated fact is that adoption of terrestrial life by our ancestors, after the erect posture had been acquired by arboreal habits, really was the fundamental change that made possible the development of human characteristics both mental and physical. The foot rendered this possible; its evolution is well worthy of study.

Terrestrial life caused the weight of the animal to be thrown entirely on the feet. With this change in function Wolff's law that "characteristic function and distinctive structure go hand in hand" came into play. Modification in structure of the foot was inevitable and the tracing of those changes is intensely interesting. The human foot probably began its distinctive development before the ancestral ape was of great size. The foot of this early anthropoid ape, as visioned by Morton, had the second metatarsal bone extending beyond the third, in accord with the humanoid line. The calcaneus was of moderate size, the foot was flexible, with but slight development of ligamentous structures, and was held in a slight degree of arboreal supination. The metatarsal bones had marked torsion of their shafts, putting the hallux and digits into suitable position for arboreal grasping, as displayed by the modern apes. Morton, contrary to the opinion of many authorities, contends, with convincing arguments, that the supinated position had nothing to do with the development of that most important structure, the anatomic arch.

While our ancestors were still living in the trees, the foot was used for rapidly moving along the branches and limbs, and it was not called on for prolonged weight bearing when stationary, or for slow walking, with the characteristic heel and toe gait of modern man.

Function demanded of the modern foot has brought about a number of structural changes: the calcaneus and other tarsal bones have become broadened and strengthened; the great toe has advanced forward, and the first metatarsal has become enlarged; the insertion of certain muscles has been changed to give strength; the ligaments have increased in strength; the muscles of the calf have increased in size and strength, and the longitudinal arch has been gradually evolved and developed to its present importance. Failure in strength of the arch is the cause of most of the ills of the human foot. As an anatomic structure it varies greatly. In some persons with no complaint at all concerning the foot, the arch is very low, but, well developed or not, it must perform its function.

Two such authorities as Dudley J. Morton and Sir Arthur Keith differ decidedly on the relative importance of ligamentous and muscular support for the arch. The former insists that in the human foot the ligaments are the chief aid in furnishing a stable base on which body weight is to be supported, whereas the latter says that "a foot may be well balanced or ill balanced but we cannot, in either case, maintain the weight of our bodies posed on the soles of our feet unless every muscle of our legs and feet is in a state of reflex activity." It is probable that the ligaments are becoming of increasing importance. I have repeatedly seen patients, with the muscles of the foot and leg almost completely gone following infantile paralysis, still maintain a very good looking foot, with a good anatomic arch, performing well its function of weight bearing provided lateral displacements were prevented by the aid of braces. Both structures are of the greatest importance, but all of us are familiar with the

acutely painful, weak foot, the musculature of which seems without fault. The muscles most concerned in support of the arch are the two tibials and the two peroneals. The smaller muscles of the feet, the quadratus plantæ (flexor accessorius) and the interossei, are also of great importance. The quadratus plantæ in man arises from the calcaneus. It has two origins, one from the outer and the other from the inner surface of the calcaneus; the latter is seen only in man, and is inserted into the lateral margins of the tendon of the flexor digitorum longus. As the process of evolution continued, this muscle developed and strengthened the sole of the foot in no small way.

Before weight-bearing and progression could be carried out with the animal in the erect position it was necessary, as previously stated, that the tarsal bones increase in size and undergo modifications, and that the action and support accorded to the bony components of the foot by the various muscles be so altered as to permit of the foot maintaining the body weight for long periods. In the pronograde monkey (ape) the calcaneus is seen to be small and ill developed, and the plantaris muscle courses over its posterior extremity, to be inserted in the forepart of the foot. The heel does not touch the ground. In the orthograde gibbon (ape) the heel rests on the branch or ground and is seen to be better developed, and the tendon of the plantaris muscle has become divided at the calcaneus, so that the distal portion acts as the plantar fascia while the proximal portion of the tendon is inserted into the calcaneus. This muscle, authorities believe, is becoming of increasing importance to man and is developing in size and strength to aid the calf muscles, which provide the leverage so necessary for the modern heel and toe gait.

The tibialis anterior in the pronograde monkey is a double muscle, and acts from the foot on the leg. It does not prevent eversion of the foot; the "Y" ligament acts in that capacity. In the orthograde (gorilla) the muscle is single but still has two tendons. To help steady the foot the peroneus longus muscle comes around the outer side of the foot and is inserted to the base of the first metatarsal bone, and the flexor hallucis longus muscle maintains the great toe in apposition with the ground. Thus are established the rudiments of the longitudinal arch, and this is the first step in its evolution. The tibialis anterior muscle in man is inserted into the first cuneiform bone and the first metatarsal bone, giving support to the arch.

The tibialis posterior muscle in the gorilla, as in all primates except man, ends in the base of the second, third, and fourth metatarsal bones. Its attachment to the navicular and inner side of the foot is partial and secondary. In man its insertion has been transferred to the tuberosity of the navicular bone. By its tonic contraction it helps maintain the talonavicular joint in a state of equilibrium, and balances the leg, and weight of the body, over the heel.

The peroneus longus muscle has its fixed points of action from the upper two-thirds of the fibula, and from the base of the hallucial metatarsal bone. In man this latter attachment has broadened to include the first cuneiform and second metatarsal bone. If the weight of the body is properly balanced on the foot the peroneus longus muscle is in a state of postural contraction, counteracting and balancing its opponents, the tibial invertor muscles of the foot.

The peroneus brevis is the opponent morphologically of the tibialis posterior. No anatomic change has affected this muscle in the evolution of the higher primates; it balances the leg from the base of the fifth metatarsal bone.

So, with comparatively slight structural alteration, the four balancing muscles of the tarsus of the prehensile foot of our ancestors have been made to do duty in the foot of man. Because of postural activities, Sir Arthur Keith says the arch of the foot of man came into being, and by the healthy action of the four balancing muscles, the arch of the foot of man is safeguarded and maintained. The foot has developed from a prehensile, grasping organ into one that is purely supportive.

Bony changes consist, broadly, in a relative increase in the proportion of the tarsal elements, not in much change in the metatarsal elements, but in a considerable decrease in the phalangeal elements. This is as would be expected, for the erect posture has necessitated, for stability, a wider, firmer, and more posterior prolongation of the calcaneus, the weight being thrown on the back part of the foot instead of the front part. The relative length and importance of the first metatarsal bone with its digit steadily increased as it became a component of the arch.

The human foot is appreciated as a wonder-

ful organ when one considers the manner in which it accommodates itself to the ground on which it is called on to bear the weight of the body. With the increase in urban and easy living, with all its sequelæ, and the necessity of standing for long hours on cement, tile, or other unyielding surfaces, it is no wonder that considerable increase in ills of the foot has developed. Modern shoes tend to inhibit development of the important smaller muscles of the sole of the foot. Although foot ills are practically unknown among aborigines who go barefooted, or who wear flexible coverings such as the moccasin of our native Indians, nevertheless, the shoe is far superior to the moccasin for the unyielding surfaces that the foot of the urban dweller encounters.

If this interesting development of the bony, muscular and ligamentous structures of the foot and the simple mechanics of muscular support are borne in mind, one is better equipped to apply remedies for the common ailments due to foot-strain. I will consider, somewhat briefly, the two most common afflictions of the foot, weakness of the longitudinal arch and metatarsalgia, and their treatment. The relationship of arthritis to flat feet will not be considered as it will lead too far afield.

WEAKNESS OF LONGITUDINAL ARCH

The longitudinal arch is composed of a posterior pillar, the calcaneus and talus, and an anterior pillar, consisting of the rest of the foot in front of the ankle. The anterior pillar has two divisions: the inner one consists of the neck and head of the talus, the navicular bone, three cuneiform, and the inner three metatarsal bones; the outer division consists of the cuboid and outer two metatarsal bones. The arch is so often the cause of complaint that the term "fallen arches" has come to be used by the laity for all kinds of foot troubles. There may be no visible lowering of the arch and still a very painful foot exists.

I have arbitrarily classified the patients whom I wish to consider under four headings (Table I).

The first group consists of those with long, slender, elongated feet, relaxed particularly in the midtarsal region, pronated, moderately abducted, and with extremely flexible midtarsal and metatarsotarsal joints. This type of foot is thought by some to be the result of a congenital tendency; undoubtedly it is often a familial characteristic. It looks weak, and is flat, but may be, and in many cases is, a foot that does its duty well, with no discomfort. In adolescence or before, children are often brought in by their parents because the foot is flat, but the patient has no complaint whatsoever. At this age it is probable that support by good, firm shoes, with proper fitting heels and a firm shank, do a great deal to strengthen the foot. No matter what is done in this way the foot remains flat, but excessive pronation and abduction may be prevented by correct shoes. These patients should be treated in childhood if possible, using firm shoes perhaps with a small, felt arch, raised inner side of sole and a small heel. The adult encounters difficulty in getting properly fitting shoes. They often accept too short a shoe to get one narrow enough, and callosities, and so forth, are the sequelæ. Treatment of this type of foot is most unsatisfactory, and if the patient wants permanent relief operative measures are necessary. Otherwise, they must be reconciled to some trouble. Arthrodesis of the navicular and first cuneiform bones is advised by Hoke, who argues logically that as the excessive flexibility in the cuneonavicular and the second and third intercuneiform joints interferes with the coördinated arch-lifting power of the tibialis posterior, tibialis anterior and flexor hallucis longus muscles, the arch must be maintained by fusion of certain of its component parts. He also lengthens the tendo achillis. Postoperative protection from any weight-bearing for at least eight weeks is essential, until bony fusion occurs. The result is a strong foot with the objectionable part of its flexibility done away with.

The second group is composed of patients with weak, painful feet, unaccompanied by appreciable

TABLE I. CLASSIFICATION OF PAINFUL FEET

1. Slender, elongated, with relaxed midtarsal region, pronated and abducted. Usually comparatively painless.
2. Weak, painful, no loss of arch, no eversion, acute flat foot. Likely to affect nurses, interns, and so forth.
3. Weak, painful, with eversion and lowering of the arch, semispastic, shortening of tendo achillis.
4. Weak, painful, with rigidity, eversion and pain on inversion. Patients are often obese adult males, floor-walkers, head waiters, train conductors, and so forth.

lowering of the longitudinal arch. This condition is often spoken of as acute flatfoot, and is seen not uncommonly among nurses, interns, and others, who are called on to be on their feet for long hours on hard, unyielding floors. The incidence of this condition in training schools for nurses has been considerably lessened by careful inspection of the feet of all probationers, and seeing to it that they are provided with good, sensible shoes. Experience in Rochester since these examinations have been carried out in both training schools, has been that it is very rarely necessary to take a nurse off duty. It is far better for them to carry on if possible. The regular regimen under which the young probationer nurse lives may cause her weight to increase rapidly by 10 to 15 pounds. This, with the arduous duties on the floor, puts a great strain on the feet. The girl should be instructed not to be on her feet any more than is absolutely necessary, obtaining rest when off duty. Hot and cold foot baths, night and morning, followed by a brisk rub with a rough towel to increase circulation, and massage with alcohol or extract of Hamamelis tends to increase the vascular tone. Exercises, particularly those that will increase and enhance the power of the quadratus plantæ (accessorius) muscle and the flexor digitorum longus muscle, such as picking up marbles with the toes (Fig. 1), stretching of the peroneal muscles and those which go to make up the tendo achillis, and increasing the power of contraction of the tibialis anterior and tibialis posterior are beneficial (Fig. 2). I have not prescribed a metal arch support for the shoes of these people for more than twenty years. When it is necessary to use an arch support, it is of felt and leather, and is fastened in the shoe. The patient should be instructed in the correct way of walking, with the feet straight ahead, and should learn the trick of flexing the toes when walking. This toe exercise will wear out more stockings but will increase the musculature of the sole of the foot. These persons should always be carefully examined to see that the pain in their feet is not due to an arthritic condition. Foci of infection, if present, must be eliminated. It is characteristic that in this type of painful feet there is little to be seen. There may be a little swelling, and localized tenderness along the arch in the region of the head of the astragalus.

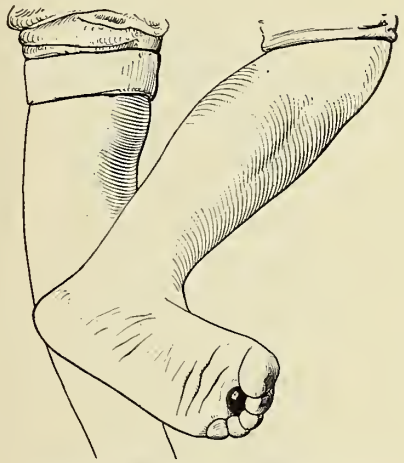


Fig. 1. Picking up marbles by means of the toes.

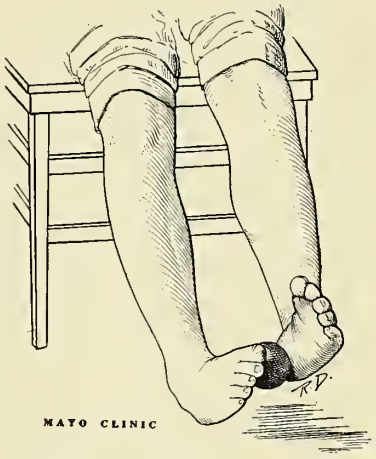


Fig. 2. Rolling a ball with the feet inverted.

The third group is composed of persons with weak, painful feet, with some eversion of the foot and lowering of the arch, with a semi-spastic condition of the peroneal muscles and with some shortening of the tendo achillis. The symptoms of patients in this group will be found to have been of longer duration than the symptoms of patients in the second group, and are accentuated. When the foot is grasped, and inversion is attempted, the patient will complain of pain over the outer side of the foot. Spasticity of the peroneal muscles will be noticed and perhaps spasticity of the tendo achillis. These people usually have run the gamut of arch supports, osteopathy, chiropractic, and so forth. Physiotherapy, consisting of application of heat and massage, and active and passive movements,

sometimes will bring relief. Too often, however, the patients do not respond to these efforts, and more drastic measures are necessary. As in the second group, arthritis must always be considered, and foci of infection eliminated. An occasional patient has the cold, clammy, flat feet that border on the arthritic type, and the condition has been called "vasospastic flat foot." The condition occurs in young persons, and the foot is often so painful that the patient is not able to work. Conservative measures do not give relief. Ganglionectomy of the lumbar sympathetic chain in a few cases has worked beautifully, but such a procedure is fit for only the very occasional case, and should be done only on clear-cut indications. Manipulation under anesthesia, thoroughly stretching the tendo achillis and peroneal muscles, and forcibly flexing the toes, breaking up any adhesions, followed by rest in a cast, with the foot held in inversion and dorsal flexion for about a week, is often successful. After the cast is taken off, active and passive motion must be carried out, and the shank of the shoe must be firm and strong. If arch supports are necessary they should be of felt and leather and not of steel. Steel arches require careful fitting and adjusting, and the foot has to adapt itself to the arch, not by any means always a painless process. If spasm of the peroneal muscles is extreme, division of their tendons is indicated. It is astonishing how soon the tendons will unite, and on account of this Sir Robert Jones many years ago insisted that a good sized piece of these tendons must actually be excised. Rest in a cast for a week should be followed by physiotherapy.

The fourth group is comprised of those patients with weak, flat, painful feet, with rigidity, eversion of the foot, and extreme sensitiveness on manipulation. Static, often combined with infectious, arthritis is associated in these cases. The patient walks along with no spring in his step, he avoids rough spots in the pavement and ground, and usually wears fairly heavy shoes with a firm sole. The condition is most often seen among men inclined to obesity, who are forty years of age or more. It is a most resistant type to treat, and if all the ordinary measures suggested have been tried and fail, there is nothing left except arthrodesis of the talocalcaneal, the calcaneocuboid and the cuneonavicular joints. Protection in a cast, with no weight-bearing, is necessary for from ten to twelve weeks after arthrodesis. It is seldom that patients are willing or able to give up so much time, and so they usually get along as best they can.

METATARSALGIA (MORTON'S TOE)

Metatarsalgia, or Morton's toe, has been recognized for years, but it is astonishing how often it is missed. It is a paroxysmal pain that is limited to the region of the fourth metatarsal bone and practically always comes on only when the patient is wearing shoes. It may be projected up along the foot and even up the limb. Some patients suffer severely and women often state that no matter where they are they must hurriedly take off their shoe when a paroxysm comes on and manipulate and squeeze the fore part of the foot. As a rule no abnormal physical signs are to be seen. The pain is often described by the patient as a burning, bursting pain in the toe. Many theories have been advanced to explain it, but none of the explanations satisfactorily fits all cases. The probabilities are that the wearing of shoes in some way throws the bones into such a position, particularly the fourth metatarsal, that they irritate the branches of the external plantar nerve and cause paroxysmal neuralgia. The condition never afflicts aborigines who go barefooted, and rarely do patients complain that they are afflicted at night, when their shoes are off. Amputation of the fourth toe and excision of the head of the fourth metatarsal bone, either alone or in conjunction with amputation of the fourth toe, has been done, but many years have passed since I have performed this operation. It has been possible to relieve patients either by fastening a transverse bar on the sole of the shoe, on the outside (Fig. 3), or by padding inside, so that the weight will be carried behind the head of the fourth metatarsal bone. The transverse bar is by all means, in my experience, the best device. All sorts of compromises, such as slipping a wedge of leather in the sole, and appliances of that sort, have not been nearly as satisfactory. All manner of apparatus and arch supports has been made for relief of this condition and if properly fitted, and worn in the proper position in the shoes, relief usually will be afforded. When the apparatus is first put in, constant supervision and adjusting are necessary, a provision often impossible to be carried out if patients come from a distance. It also requires considerable mechanical ingenuity and

skill, as well as willingness on the part of the surgeon and patient to fuss with it. Hence my preference for the transverse bar. Certain types of shoes, particularly those with an inflare for the front part of the foot, may be the cause, and



Fig. 3. Shoe with transverse bar in place on the sole.

the condition may leave on these shoes being abandoned.

SUMMARY

The foot of man, purely supportive, has been evolved from the relaxed, flat, grasping, prehensile foot of the ancestral primate ape. The muscles were first used to grasp and steady the leg on the foot. As mode of locomotion changed and the erect posture was attained, the heel bone and tarsal bones became larger, the metatarsals and phalanges decreased in size, ligaments developed, particularly the plantar fascia, and the longitudinal arch came into being and heel and toe gait was acquired. The tibial, the peroneal and the flexor hallucis longus muscles and tendons were the most important, and later the intrinsic muscles of the sole, particularly the quadratus plantæ, aided. Inversion and eversion of the foot became the means whereby balance was maintained, and the strong muscles of the calf provided the leverage on the posterior portion of the calcaneus so essential in walking.

The common complaints referable to the foot are due to strain and giving way of the longitudinal arch. Four general groups of feet with reference to the longitudinal arch are recognizable: first, the flat, elongated, flexible, slender foot, often with no pain, pronated and everted; second, the acute, painful, weak foot of normal appearance usually the result of prolonged and unusual strain; third, a group in which the foot might be said to be an exaggeration of the foot in the second group, and fourth, the broken down, flat, rigid foot, usually seen in middle adult life. Treatment is briefly considered in the body of the paper.

Metatarsalgia is paroxysmal neuralgia affecting the branches of the external plantar nerve, causing distressing pain in the region of the fourth toe. It is due to wearing improper shoes, and relief almost always can be afforded by placing a leather bar transversely on the sole of the shoe so that the weight is carried just posterior to the heads of the metatarsal bones.

PRESENT DAY CANCER PROBLEMS*

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THE cancer problem rapidly is becoming one of the major problems of medical practice and hospital service. Practically all medical specialties are concerned with it, for no part of the body is immune to attack.

Cancer is one of the oldest known diseases. The Papyrus Ebers of 1500 B. C. mentions the disease, as does the oldest literature of India and Persia. Hippocrates describes cancer of the skin, breast, uterus and other internal organs. He differentiated between benign and malignant tumors and burned out cancer of the neck, the earliest recorded use of diathermy. Preceding Hippocrates, Democedes, in 520 B. C., cured Atossa, wife of Darius Hystaspis, of cancer of the breast. The writings of Galen, Cato, Pliny and Celsus, to mention but a few of the men known to earliest medicine, contain frequent references to malignancy and its treatment.

Since 1927 cancer has held second place as a cause of death in the United States, being exceeded only by heart disease. The latest statistics from the Bureau of the Census, those for 1930, show that 115,265 deaths were recorded from malignancy, giving a death rate of 97.2 per 100,000 during that year, the highest ever recorded for this disease in this country. It may be of interest to note that in 1900 tuberculosis stood first as a cause of death with a rate of more than 200 per 100,000, and cancer was in sixth place with a rate of 63 per 100,000. In 1930, tuberculosis had dropped to sixth place with a rate of 71.5, while cancer had advanced to second place with a rate of 97.2. In Minnesota cancer deaths are increasing at the rate of approximately 100 each year, and now amount to one in eight, or 12.5 per cent, of all deaths within the state. There were 3,199 cancer deaths in Minnesota last year, or one every two and three-fourths hours.

Education has had much to do with the rapidly declining death rate from tuberculosis, and it is not too much to expect that cancer will in due time respond to similar measures.

The question is frequently asked whether cancer is increasing, and much ink is spilled in arguing the pros and cons. It is true that a larger percentage of the population is living in the cancer age period and that diagnostic methods are more refined than formerly. Whether these two important factors are the answer to this question is not so important as is the fact that more people are dying of cancer each year, and the major problem is not so much statistical as it is the finding of ways and means for reducing this rapidly mounting death rate.

It is only within the past thirty years that any particular attention has been given to cancer from the standpoint of research into its clinical and etiological factors. Up to that time the disease was first seen so late in its course that little, if anything, could be done for it. Radium and deep therapy were unknown in the treatment of this disease and surgery was the only form of therapy used. Even today, irradiation is viewed askance by some surgeons, although it is now definitely accepted as the method of choice in treating cancer of the cervix, skin, and buccal cavity.

Since 1900 marked progress has been made in the diagnosis and treatment of malignancy. Certain fairly definite indications of early cancer and pre-cancerous lesions are now recognized and accepted by workers in this field. As examples I might mention unrepaired cervical lacerations following childbirth; the combination of a luetic history, leukoplakia, neglected mouth hygiene and the use of tobacco; the presence of non-hairy, dark colored moles on the body surface; the keratotic, scaly, moist patch on the skin of the face and the scalp, as fair indications of the development of cancer in the parts mentioned. Very recently, Schiller of Vienna has described a test for cancer of the cervix in its preclinical stage. By painting the cervix and adnexa with Lugol's solution early cancer will be indicated by lack of staining in the area. Biopsy in that area will show beginning malignant degeneration.

Transillumination of the breast, developed by

*Read before the Minneapolis Surgical Society, November 3, 1932.

Dr. Max Cutler of Michael Reese Hospital, Chicago, while not as selective as the method just described, gives valuable information regarding the character of the tumor mass in the mammary gland. By this simple means, which can be carried out at little added expense, clear fluid cysts, solid tumors, hematoma, papilloma and mazoplasia or chronic mastitis can be differentiated as well as definitely localized in the mammary gland. This method also has value in proving to a woman concerned about a possible breast malignancy that in the absence of such a malignancy the breast will show a uniformly translucent appearance which she can see for herself.

The x-ray is of incalculable value in the diagnosis of bone and intra-abdominal malignancy and obviates the necessity of surgical exploration in many cases.

The value of biopsies in the diagnosis of cancer needs no special pleading before this audience. Its utility and value when properly done carry little risk to the patient and it gives the most accurate answer to the type of tumor.

These few illustrations will serve to indicate some of the marked advances in the diagnosis and treatment of malignancy that have been made in the past few years, certainly within the professional experience of many in this audience.

Aside from the delay by the laity to seek early medical care, which will be discussed a little later, some of the retarding factors to an improved cancer service have been the inability of some physicians to appreciate the possibility of malignancy or to diagnose cancer when the patient first presents himself for examination, followed by a period of "watchful waiting" for more positive diagnostic signs, a period always fraught with the utmost danger to the patient as each day's delay lessens the chance for a cure. Another class of physician has been charged with temporizing with his treatment in order to increase his fees in the case. This type of physician we know to be in the vast minority, but like the proverbial rotten apple that spoils the barrel of good fruit, one such individual can cast a shadow over the ability and integrity of all other physicians in the community in which he resides.

The use of deep x-ray therapy and radium as therapeutic agents in the treatment of malignancy has been definitely established, yet in many communities their utility is questioned by some physicians, principally due to the unfavorable results seen. These results have been brought about by the abuse of these agents at the hands of untrained physicians rather than by their use by competent men. When properly used they have a distinct place in the therapeutic armamentarium of malignancy, but they are also the most highly specialized forms of therapy known to medical science. To be used safely and effectively, the physician must know not only the type of tumor he is treating, that is, whether it is radiosensitive or radioresistant, but also the proper dosage, methods of implantation, proper filtration and screening, tissue penetration and tissue reaction, to say nothing of the problems of electricity and physics involved.

In general, the practice of supplying radium and radium emanation to the average physician for use in the treatment of malignancy will add little to a solution of the problem or to the benefit of the patient. Seldom will the proper dosage be given. Either the patient will be undertreated in order to avoid tissue damage and damage suits, thereby converting an originally sensitive tumor into a resistant one making any subsequent irradiation difficult, or the patient will be overtreated and permanently damaged.

The Report of the Royal Commission of Ontario on the Use of Radium and X-rays in the Treatment of the Sick, just published, says on page 100:

> "Successful results in the use of these remedies depend upon their use in skilled hands and upon early diagnosis. Inadequate or unskilled first treatment by radiotherapy is liable to hasten the progress of the disease."

Further in their recommendations, on page 106, it is stated:

> "Your Commission advises that no center be established until competent personnel for such center is available and in this connection desires to emphasize the fact that in unskilled hands such potent weapons as x-rays and radium may do more harm than good."

The pessimism that obtains in the minds of many physicians regarding the possibility of cure of malignancy should be replaced by a more optimistic attitude. It is now known that while a complete recovery cannot be expected in many cases, a prolonged period of comfortable living can be given these patients by proper palliation. Frequently such patients will violate all prognoses and become permanently cured.

At the recent St. Louis meeting of the American College of Surgeons more than 8,800 five-year cures of cancer were reported. Doubtless there are many thousand more such cases. Cancer is curable, and is one of the few diseases in the catalogue of medicine that will respond entirely to the skill of the physician. It is not a self-limiting disease as are practically all other diseases, but must be eradicated completely to save the patient's life, and in this eradication the skill of the physician is the all-important factor.

In addition to providing adequate facilities for the diagnosis and treatment of cancer, the major responsibility of the hospital, which it must share with the physician in the case, is that of adequate records and follow-up on cancer patients. No cancer case should be considered closed until the death certificate is added to the record. Freedom from the disease for twenty years has been followed by fatal recurrences. Periodic contact should be maintained with all cancer patients for as long a time as possible, preferably for life. This is often difficult for the physician or hospital alone, but when a joint undertaking is launched, especially when trained medical social workers are available, few, if any, cases will be lost. Some hospitals report 100 per cent success in their follow-up, while others rank lower in this regard. In any event a large percentage of post-treatment contacts can be maintained when there is full coöperation between the hospital and its staff.

The major problem with the laity is that of getting patients to seek medical care as soon as they suspect or know something is wrong. In spite of all the educational work that has been done an average of more than six months' time still elapses after the patient suspects or knows something is wrong and seeks medical aid. One reason for this delay is that there is little discomfort or pain associated with most forms of malignancy in early stages. There are also two outstanding fallacies in the public mind regarding cancer; one, that the disease is always fatal regardless of how early it is diagnosed; the other, that there is a social disgrace connected with this disease, therefore it is concealed as long as possible. Both ideas are erroneous and greatly increase the problems of prevention and control.

Some physicians criticise cancer educational work among the laity because of the fears or phobia created in the minds of a few neurotic individuals. A rather careful investigation of this problem among a large group of applicants for admission to cancer hospitals and clinics has shown the fallacy of this situation, as but 2 per cent of 2,000 admissions could be placed in this class. These were neurotic individuals who, in the absence of a cancerphobia, would entertain a phobia of falling hair or fallen arches or anything in between. Instead of a fear of dying of cancer there should be encouraged a fear of beginning cancer and a fear of delay in seeking treatment. The public should be led to know that cancer is curable, with the odds almost entirely in favor of the early case. No one is better fitted to give this information to the public than the physician.

The question of hiding from the patient the true nature of his disease is still a debatable one. More and more physicians and hospitals are adopting a method of frankness in this matter and I believe it to be a sane and practical method to follow. The time is past when the medical profession can accomplish much good by being secretive in such matters. The public is fed daily by the press and the radio information on disease and health subjects. Few people remain long in ignorance about such matters. Probably more physicians are fooled by their patients who do not let on that they know they have the disease than are able to keep their patients in blissful ignorance of their true condition. Frankness invites coöperation, while sidestepping the issue often raises doubts in the patient's mind about his true condition and also about the ability and integrity of the physician in charge of the case. Lack of frankness often drives patients into the hands of quacks who are too brutally frank, and also tends to make "medical shoppers" of patients seeking the answer to their problem. Physicians and hospitals who adopt a frank attitude on this question report the fullest coöperation from their patients.

This very brief outline of some of the major factors in the malignancy problem suggests that the solution is neither a simple nor easy one. No standardized methods of procedure have been or can be applied because of varying local conditions. It is felt that none should be attempted until the facts bearing on each community are known and they can be determined only by careful investigation.

Such surveys as have been made have brought out interesting facts. It has been found that approximately 2 per cent of the average general

hospital adult intake is for cancer. About 25 per cent of the probable cancer patients are hospitalized during a given year. It is estimated that there are three living cases for each death during a year, and strangely enough statistics show us that the number of deaths from cancer in a given state during a year closely approximates the number of licensed physicians in that state at that time. Many times when this comparison is made on a county basis the figures are identical. It is also found on the above basis that there would be but three cancer patients per physician were all distributed equally among the profession.

Where facts of this nature have been developed, the problem has been clarified materially. Relate them to the hospital facilities for the diagnosis and treatment of this disease and the problem for any community is fairly well established.

The lack of facilities in many communities, such as those for adequate laboratory diagnosis or for treatment by means other than surgery, indictates the desirability of reference of cancer patients to institutions where adequate service can be had; either this or the development of adequate facilities within the community. Because of the small number of cancer patients seen in the smaller general hospitals it is not practical or logical to expect that facilities for complete care of these patients will be provided in such institutions. Present methods of treating tuberculosis suggest the possibility of providing centers for the care of cancer patients where they will be under the care of a staff specially trained in this work.

To render adequate cancer service today a hospital should provide facilities for the histological examination of tumor tissue by frozen section as well as by paraffin sections and pathologists trained in this field and competent to interpret the microscopic picture; competent surgeons; deep therapy with a minimum effective capacity of 200,000 volts frequently calibrated and with a competent roentgenologist in charge, and 150 milligrams or more of radium in a variety of containers, this also to be in charge of a trained radium therapist. Facilities should also be available for record keeping and follow-up on all patients using this service. When facilities are lacking in part there should be no hesitancy in referring patients to other institutions where such facilities are available. The welfare of the patient will be best served and the reputation of the physician enhanced by such reference. In every instance, treatment should be predicated on laboratory findings as to the nature of the tumor.

Cancer is not a "one man" disease. As just indicated, the pathologist, the roentgenologist, the radium therapist, and generally the internist in addition to the surgeon or surgical specialist in whose field the tumor lies, has a responsibility to the patient. Their opinions are of value in arriving at the diagnosis and treatment of each and every case.

Time will not permit me to discuss this point further, and I shall refer you to the minimum standards for organized cancer service in general hospitals promulgated by the American College of Surgeons for an elaboration of this procedure.

When adequate facilities for the diagnosis and treatment of malignancy are provided and competent personnel is available in a number of centers in each state, it will then be in order to institute intensive lay educational campaigns to bring about early diagnosis. Too often at the present time facilities are lacking in many places properly to care for the cancer patient, and it is believed that the best interests of all will be conserved by concentrating on the development of adequate professional and hospital facilities for the diagnosis and treatment of this disease.

Cancer is a problem for the medical profession and the hospitals, and the interest of the intelligent public should be restricted to strengthening the resources of these two groups. How long lay activities can be held to this purpose depends on the wisdom and alacrity with which the profession and the hospitals meet the situation. Should undue delay or failure result it can only be expected that public demand will be met by state participation in the program. That this possibility is more than a mere fantasy may be gathered from the fact that nine states now make cancer a reportable disease, and in one other state, Massachusetts, with a state-wide cancer program under the Department of Health, the law provides that this work shall be done "with or without" the coöperation of the local physicians.

One other resource or agency should be added to those mentioned as having an interest and responsibility in this work. I refer to the official health department. Inasmuch as one of the chief functions of such departments is that of health education they have a distinct place in the cancer

control program. Official health agencies should not enter the diagnostic or therapeutic field but should confine themselves to educational activities. Where adequate laboratory facilities are not available or cannot be made available otherwise for the examination and interpretation of tumor tissue, the health department might meet this need through an expansion of its laboratory service, thus providing a service for the physicians of their jurisdiction. Also such departments can render useful service in the follow-up of cancer patients through their public health nurses and vital statistics bureaus.

Before concluding I would like to say a word about the American Society for the Control of Cancer and its relation to the problems discussed above. The object of the Society, as stated in its certificate of incorporation, is "to collect, collate and disseminate information concerning the symptoms, diagnosis, treatment and prevention of cancer; to investigate the conditions under which cancer is found and to compile statistics in regard thereto." These objectives have been interpreted broadly as educational in character. After spending several years in various forms of lay educational work, the Society has concentrated its efforts on working coöperatively with the medical profession and the hospitals in the improvement of facilities for the better care of cancer patients. It is in keeping with this purpose that the survey now under way in Minnesota was undertaken. Having determined on this policy the Society looks to the regular medical organization of the state and the various counties as the representatives of the profession in these areas and considers them the basis of its activities in a given community. For instance, no activities beyond those of a most general nature are undertaken in a community until an invitation is received from the medical society to do so, and reports on activities undertaken as a result of such invitations are made to the medical society issuing the invitation. The Society distributes literature similar to that available this evening. It also furnishes without cost except return transportation charges the film shown at this meeting. It strives in any and all ways to be of service to all responsible groups interested in cancer prevention and control.

The state and local branches of the American Society for the Control of Cancer are organized on a plan similar to that of the medical societies. There are state committees and local committees. The state committee is under a state chairman appointed by the Executive Committee of the Society. He is a physician in good standing in his state medical society and able to work with the different interests involved in a given community. The state committee is composed of both professional and lay members who because of their interest are willing and able to contribute to the promotion of the work. Where sufficient interest is shown in a local community a local committee, with a physician as chairman and composed as is the state committee, is formed to work in that area. These local committees are expected to work with and through the state committee and state chairman and confine their activities to their local territory unless invited by the state chairman to participate in a larger program.

The purpose of these committees is to help the medical profession and the hospitals in all practical ways to render a better service to cancer patients in their respective communities, and when conditions warrant assist in lay educational activities.

It is believed that with the education of the medical profession accepted by the medical organizations as their responsibility and with the official health agencies providing health educational facilities to the public, and with the state and local committees of the American Society for the Control of Cancer assisting both groups to do the best work possible, a united and constructive attack can be made on the cancer problem that in time will be reflected in the correction of many precancerous conditions before they have developed into frank malignancy, and in reduction of mortality from this disease.

UNDULANT FEVER TREATED WITH METAPHEN*

A. C. Fortney, M.D.
Fargo, North Dakota

MANY drugs and therapeutic measures have been advanced for the treatment of undulant fever, but most of them have been discarded as unsatisfactory. Since the disease, at least in its early stages, is a bacteriemia, any drug that, injected into the blood stream, will kill the organisms, with a minimal amount of reaction, is highly desirable. My attention was first attracted to metaphen by various reports in the *Journal of American Medical Association,* showing its high bactericidal power with low incidence of reactions and complications. I have used the drug in other blood stream infections with gratifying results, and so decided to use it for undulant fever, at the first opportunity.

CASE REPORT

G. M., a white female, aged forty-one, housewife, entered the Clinic on January 12, 1933, complaining of a severe frontal headache, which had begun three months before. It had been getting worse and at the time of admittance was persistent night and day. Nothing important was revealed in her history except that two weeks before she had had a severe head cold with a rather profuse nasal discharge, which cleared up in a week. Her first physical examination revealed only bilateral clouded maxillary sinuses. She was referred to Dr. G. A. Larson, who washed out considerable pus from both antra. Her headaches were promptly relieved. Examination on her first visit showed: temperature 99; w.b.c. 6,150; r.b.c. 4,660,000; hemoglobin 80; urine normal.

On January 16, I was called to the house because she was having chills and fever. On examination her temperature was found to be 101 F. and she was having chills followed by drenching sweats, every eight hours, with clock-like regularity. At the time of the chill her temperature was usually found to be 103 or 104. Three or four hours later the temperature would be 98. When her temperature was normal, the patient felt perfectly comfortable and certainly did not appear as ill as might have been expected for one who just a few hours before had had a temperature of 103 or 104. Now her white blood count was found to be 4,600 with 40 per cent lymphocytes, 30 per cent segmented, 19 per cent staff, 2 per cent eosinophiles, and 9 per cent monocytes. Undulant fever was suspected, particularly as it was found that she had been drinking raw milk from a neighboring farm. However, the first specimen of blood was returned negative for undulant, typhoid and paratyphoid fevers.

The above picture continued for three days and then the patient was hospitalized. A second specimen of blood was then examined and on January 19, 1933, agglutination for undulant fever was found positive in dilutions of 1:640. Ten c.c. of metaphen 1:1000 was then given intravenously, undiluted, without the slightest sign of either local or general reaction. Following this injection she had no more chills and the highest the temperature reached was 101. The patient felt much better and clamored to go home. However, the temperature ranged from normal to 101 until the twenty-third of January, when I gave her a second injection of 10 c.c. of metaphen. Following this, the temperature promptly dropped to normal and on the 25th she was discharged.

At home the patient checked her temperature every four hours for the following three weeks, but the temperature in no instance went above 98.6. On February 18, I rechecked the blood to see what had happened to the agglutination titer and found it to be present in a dilution of 1:2560. This was checked in two different laboratories using three different strains, and in all instances the reports were similar. The patient has reported back to the office regularly for observation, but she has had no more subjective or objective symptoms of undulant fever.

COMMENT

A case of undulant fever is presented which was observed from its onset, and which was treated with metaphen 1:1000 intravenously. The clinical duration of the disease was exactly ten days, and the temperature became normal six days after the use of metaphen was instituted. No other drugs were used. No reactions followed the use of the drug. The case is presented because of the apparently prompt response and to stimulate the further use and study of the drug in such cases. The fact that the drug was first used shortly after the clinical onset of the disease may account for the good response and one can only conjecture what results might be expected in a chronic case of undulant fever. However, its use in all cases seems indicated. The high agglutination titer one month following discharge from the hospital is striking.

*From the Medical and Surgical Clinic, Fargo, North Dakota.

CASE REPORT

MANAGEMENT OF OPEN SAFETY PIN IN THE DIGESTIVE TRACT

GEORGE EARL, M.D.
Saint Paul

Baby Elizabeth M., ten months of age, was first seen October 12, 1932, at about 10 a. m., with a history of severe cough, listlessness and fever. The mother thought that the child had swallowed a safety pin because there had been one missing from the bed sheet two days previously. However, she had not seen the child handling the pin. There was nothing else of importance in the history.

Physical examination showed a well-nourished child with a severe and constant cough. Restlessness and irritability were outstanding. An erythematous rash was present on the chest and back. This rash resembled one of scarlet fever but was not typical. The eyes were normal. The throat was reddened, and there was a nasal discharge. There was no vomiting. Her temperature was 101 degrees. The lungs were normal and the heart also except for a tachycardia. The abdomen was distended. There was no neck rigidity and neurological examination was negative, including a negative Kernig.

An x-ray plate (Fig. 1) revealed an open safety pin at the level of the first and second dorsal vertebræ with the blind end pointing downwards. Later fluoroscopic examination at 6 p. m. the same day showed the pin in the stomach, and, therefore, it was decided to treat the child conservatively in the hope that the pin would be passed. The child was taken home and apparently was quite well for three days.

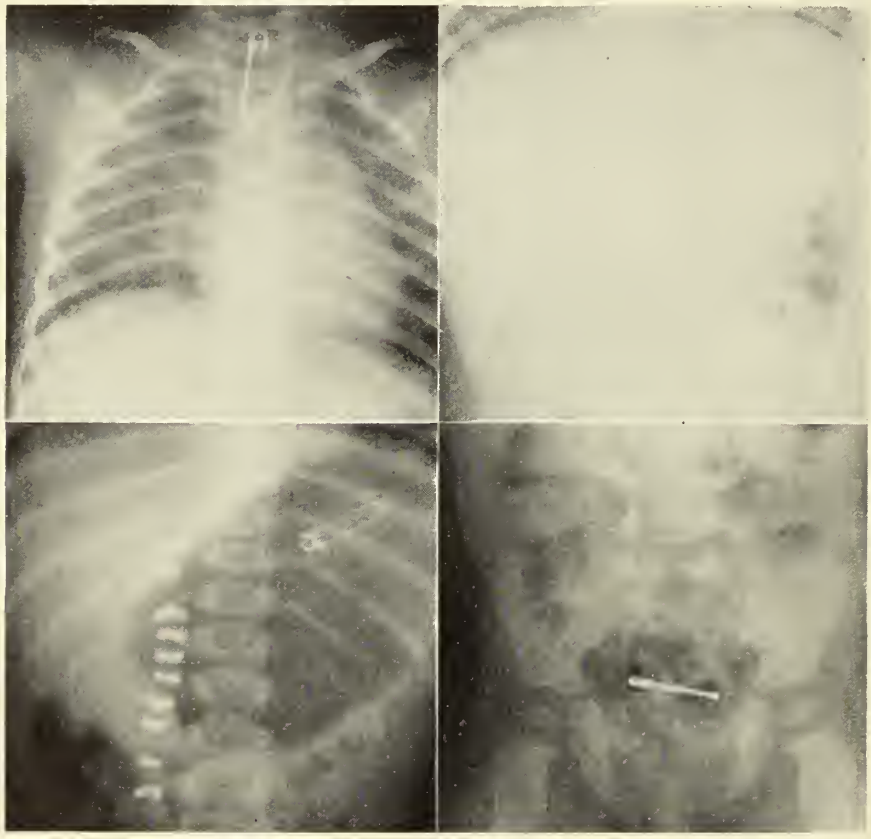


Fig. 1. *(upper left).* Pin in esophagus.
Fig. 2 *(upper right).* Pin in stomach. Clasp in pylorus and point in stomach wall. Barium present in stomach.
Fig. 3 *(lower left).* Pin closed in stomach. Second day post-operative.
Fig. 4 *(lower right).* Pin in rectosigmoid. Fourth day post-operative.

Four days later (October 16, 1932) the patient was admitted to the hospital, not having passed the pin. The mother complained that the child had been refusing her feedings. Further examination was essentially negative except for a markedly distended abdomen. Laboratory findings were negative. X-ray examination (Fig. 2) with aid of barium by mouth showed an open safety pin at the outlet of the stomach, apparently straddling the pyloric sphincter, fixed and showing no tendency to move on gentle palpation. Tenderness over this area was apparently marked. Temperature, which had been approaching normal during the intervening days, had risen to 102.5 degrees.

With these findings, a laparotomy was performed under a combined local and gas anesthetic. The stomach was found to be distended with gas, which was released by means of small tube by mouth. The pin could then be palpated in the pylorus apparently straddling the sphincter. The pointed end was projecting downwards towards the pancreas, and the opposite end towards the gallbladder. The protecting sheath was in a direction corresponding with that of the pointed end. Cautiously the pin was manipulated back into the stomach, closed, and left there. Neither stomach nor bowel was opened, and there was no evidence of perforation or peritonitis.

The incision was closed in routine fashion without drainage. Immediate post-operative condition was very satisfactory and continued so. Immediate treatment consisted of sedatives (codein) and fluids (hypodermoclysis) to tolerance. There was no vomiting, and feedings were restored on the first post-operative day. An x-ray checkup was done on the second post-operative day (Fig. 3) which showed closed safety pin in the proximal end of the stomach. Barium given previously was then in the rectum, showing a normal motility. Temperature and pulse returned to normal late on the third post-operative day and continued so until discharge. Another x-ray (Fig. 4) was made on the fourth post-operative day which showed the pin in the rectosigmoid.

The pin was recovered on the fifth post-operative day following an enema, and the patient was discharged on the sixth day with recovery apparently complete.

Dr. Greth Gardiner, consultating endoscopist, had suggested in the event of a subsequent laparotomy that the pin be closed through the bowel wall and left to pass, thus greatly decreasing the possibility of an operative death. Children of this age are known not to tolerate opening of the bowel, and while there is probably less risk in opening the stomach than the duodenum, the risk should be avoided if possible.

At the time of the operation, as far as Dr. Gardiner knew, the suggestion of closing the pin and allowing it to be passed was independent thinking. Dr. Gardiner had made an extensive search of the literature three years previous, and at that time such a procedure had not been suggested. His search of the literature had followed a peritonitis death from the removal of a safety pin in the bowel, and at that time the thought had come to him that it would have been better just to have closed the pin and let it pass in the natural way. This case, in which he was called in consultation while the pin was in the esophagus, offered the first opportunity to make the suggestion.

We recently note in the March 11 issue of the *Journal of the American Medical Association* a report of Dr. Harry Otten, of Springfield, Illinois, of a case operated October 4, twelve days previous to our case, in which Dr. Otten closed the safety pin in the stomach, fed it into a stomach tube, and removed the pin by that method. He states that he debated at the time whether to remove the safety pin through a gastrotomy or to let it pass the natural way, and finally decided on the method of using a stomach tube.

A newspaper report of April 6 from Chicago reports that Dr. Gustav Herpe, on April 4, closed a safety pin in the stomach of a child, which pin the child later regurgitated.

The purpose in making this report is to credit Dr. Gardiner's suggestion as one of independent thought previous to any report in the literature, and also to suggest that a closed safety pin of this size is so certain of natural passage that any manipulation beyond its closure is probably not indicated.

President's Letter

AT this time the attention of the physicians of the northwest, and especially the members of the State Medical Association, should be directed to the eightieth annual meeting, which occurs at Rochester on May 21, 22, 23 and 24.

The meetings of the State Medical Association have, from year to year, been assuming a greater magnitude and have come to be the outstanding scientific and economic event in medical circles in this, and surrounding states.

The preliminary draft of the program for this year assures us that this will be, beyond doubt, the greatest meeting the association has ever held, and offers a splendid variety and choice of scientific presentations, which no medical man can possibly afford to miss.

This meeting at Rochester will be excellently housed, with ample and convenient space for all lectures, exhibits, demonstrations, and moving pictures.

A new departure, and one which should attract great interest, is the Monday program which is put on by eight of our statewide societies of specialists, the material to be presented in such a way, and of such nature as will be of great value to the general practitioner.

With the creative genius of our secretary, E. A. Meyerding, and the facilities of the Mayo Clinic at their disposal, the committee in charge has arranged a program of science, economics, entertainment, and sports, which will long be remembered by those who are fortunate enough to be able to attend.

Hoping to see all of you there, I am.

Yours very truly,

H. O. Pearce

President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

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THE STATE MEETING

Time marches on apace. The month of our annual State meeting has arrived. Never before in our recollection has the annual meeting been held in Rochester. What better spot for a get-together than this small Minnesota town so famous as a medical center?

Glance through the scientific program which appears elsewhere in this issue and, if in the array of addresses, demonstrations and scientific exhibits you can find nothing of interest, plan to absent yourself. Even the movies will be in evidence in their new field of usefulness.

A five-ring circus will have nothing on our meeting this year with four and five societies of specialists performing simultaneously. "You've paid your money, take your choice."

There will be no banquet this year. Although to some this omission will be a source of real regret, to others there are better ways of spending the dinner hour on a nice summer's evening.

Medical economics will feature the Monday evening assembly. That entertaining medical editor, Dr. Morris Fishbein, ably assisted by the inimitable Dr. Charles H. Mayo, will expound to us on the "Trends of Medical Practice." Some think it is fast going to the dogs. We shall see. We are all interested in the subject of legislation and shall have the opportunity of obtaining first-hand information from the chairman of our Legislative Committee, Dr. Herman Johnson. Dr. A. W. Adson, president of the State Board of Medical Examiners, will also inform us of the recent activities of this body.

At the Tuesday evening meeting Dr. G. B. Eusterman will welcome us in behalf of the Olmsted-Houston-Fillmore County Society—hosts of the occasion. Mrs. A. A. Passer, president of the Women's Auxiliary, will report on the activities of this valuable organization. There is no one better posted on our State Association activities than our president, Dr. N. O. Pearce. While medical economics are closely linked with the deplorable economic state of affairs in the world at large, there are certain subjects in the limelight at present of vital importance to the medical world. We assume that Dr. Pearce will touch upon these matters. Those who have heard Archbishop John Gregory Murray of Saint Paul know that here is a man who knows whereof he speaks. His message is sure to be inspiring. The outstanding visitor who will address the convention is Dr. Dean Lewis, president-elect of the American Medical Association. We shall all be interested to hear what is going on at the national association headquarters.

With Rochester so easily accessible and so lit-

tle need for us at home, a large and enthusiastic meeting is in the offing. Let's go!

LOSS AND REPLACEMENT OF FLUID AFTER BURNS

In 1923 Underhill and his associates demonstrated the increase that may occur in concentration of blood of severely burned patients. They expressed the belief that this change was the result of loss of fluid through the burned area and that the fluid was plasma, or at least modified plasma. Recognition of these facts suggested to them a rational method of treatment for this condition, which consisted chiefly of administration of large amounts of fluid, some of which was in the form of physiologic saline solution. The results that they obtained were striking. Their work has been confirmed by subsequent extensive investigation, much of which has been done by Underhill and his co-workers.[4] It has been shown that the increased concentration of blood following a burn is the result of loss of fluid from the blood through increased permeability of capillaries in the burned area. Unexpectedly large quantities of fluid may be lost in this way.

In experiments on animals, superficial burns involving approximately one-sixth of the surface of the body have been inflicted under anesthesia, and have resulted in loss of water from the blood stream, amounting to as much as 70 per cent of the total volume of blood. Probably in more extensive burns the loss of water is even greater. Reabsorption of this fluid is exceedingly slow during the first few days after a burn, indicating that the increased permeability of the capillaries is effective in only one direction.

The fluid which is poured out on the surface of a burned area partakes of the nature of plasma. For this reason, decrease in the chlorides of the blood would be expected, and it does occur in many of the severe cases. The reason that it does not occur with more uniformity is because the organism possesses marked ability to compensate for losses of chloride. As much as 36 per cent of the sodium chloride of the blood may be lost without causing alteration in the chloride content of the blood.

Significantly increased concentration of blood may result in failing circulation, oxygen starvation of the tissues, oliguria, and finally death. The observation has been made that concentration of the blood to 140 per cent of the normal value is, in a short time, incompatible with life, and concentration to 125 per cent of the normal value results in a precarious condition.[3]

Fortunately this condition is easily recognized by simple determinations of hemoglobin, and these should be made as a routine in all cases of serious burns. By prompt and appropriate measures to overcome the increased concentration of the blood, many patients recover who otherwise would die within the first few days as a result of this condition. Rational treatment consists in administration of adequate fluid, and salt, as suggested by the original observers,[3] and also in applications to the burns of such a substance as tannic acid, which markedly reduces the loss of water from the burned area.

The amount of fluid that is necessary varies considerably, depending on the severity of the case, but from 4,000 to 8,000 c.c. daily is usually advisable until the excessive concentration of the blood has been corrected. The larger amount designated is rarely necessary, now that the tannic acid treatment introduced by Davidson has become widely used.

Because loss of fluid through the burned area is constant, the intake of fluid should be as continuous as possible. Much of it may be given orally, but usually this is best supplemented by physiologic saline solutions given intravenously, by proctoclysis, or by hypodermoclysis. Large quantities may be administered intravenously by use of the continuous Murphy drip, allowing a period of from two and a half to three hours for administration of one liter. In most cases, if the foregoing plan of treatment is followed, improvement is soon noted; however, the concentration of hemoglobin should be determined frequently, and if the high concentration of blood and the accompanying oliguria persist, intravenous administration of acacia should be seriously considered.[2] In some cases, in spite of adequate administration of fluid, the fluid leaves the blood stream rapidly, and in such cases the acacia helps to hold the administered fluid in the circulation.[5] In all cases of shock or impending shock it is advisable to give acacia intravenously. It is best to give physiologic saline solution first, followed by

acacia and then by more physiologic saline solution.

The occurrence of increased concentration of blood in many cases of severe burns is undeniable, and, in spite of all that has been written concerning it, is not generally appreciated. Probably the majority of patients with significant burns are still being treated without a single determination of hemoglobin being made and without it being recognized that concentration of the blood has increased. Fortunately, however, the practice of administering fluids freely in such cases has become general.

Although the tendency toward excessive concentration of the blood and lowering of the value for blood chlorides is present in all cases of extensive burn, actual changes in the blood are not demonstrable in all cases. There are several reasons for this. The burn may not have been sufficiently extensive, or prompt and adequate administration of fluids and local treatment to the burn to minimize loss of water may have averted the anticipated changes. Or the compensatory mechanism may have been adequate. It has been shown that the organism, without ingestion of food or water, possesses the ability to compensate for water lost to the area injured by a burn to the extent of at least 70 per cent of the blood volume.[4] But ultimately this mechanism breaks down, and when it does break increased concentration of the blood, with its dangerous sequelæ, occurs. The principles of treatment here outlined, therefore, should apply in all cases whether or not significant changes can be demonstrated in the blood.

E. G. B.

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THE RELATION OF TOBACCO TO CIRCULATORY DISTURBANCES OF THE LOWER EXTREMITIES

The association of excessive smoking, particularly of cigarettes, with thrombo-angiitis obliterans has been noted frequently, although the exact etiologic relationship to this fairly definite clinical and pathologic syndrome is still debatable. A statistical study made at The Mayo Clinic a few years ago in 350 cases of thrombo-angiitis obliterans revealed that only 1.4 per cent of the patients had never used tobacco whereas 61 per cent smoked cigarettes excessively, as compared with 26 per cent who did not smoke, and 33 per cent in a control group of 350 male subjects of similar ages who smoked excessively. However, when one considers that thrombo-angiitis obliterans is not a common disease, one is forced to the conclusion that its incidence among all heavy smokers of cigarettes is rare. Also, in spite of the great increase in cigarette smoking among women in recent years, the disease is still extremely rare among them.

Recently, some interesting work has been done by Sulzberger and by Harkavy, Hebald and Silbert in determining the hypersensitivity of the skin of patients with this disease to tobacco extracts. Sulzberger found this hypersensitivity in 77 per cent of his series of cases of thrombo-angiitis obliterans and in 36 per cent of a control series. Harkavy, Hebald and Silbert noted even more striking data: hypersensitivity of 89 per cent of patients compared with only 10 per cent of their control subjects. Nicotine seems to have been excluded as a factor. Hypersensitiveness to tobacco could possibly explain many of the riddles in this disease, but one must be careful not to jump to this explanation as there is a gap between skin allergy and the rather distinctive pathologic changes found in the blood vessels. Also, there remains a definite group of patients with thrombo-angiitis obliterans who do not seem to be skin-sensitive to tobacco. Further studies of larger and more varied groups of cases are desirable.

Another report published within the last year by Maddock and Coller may be even more significant. They found that twenty subjects, both light and heavy smokers, had a definite drop in cutaneous temperature of the digits following the smoking of three cigarettes during a standardized

test. After filtering the smoke and using other types of smoke the effect was not noted and it was concluded that absorbed portions of the tobacco smoke were responsible. The fall in cutaneous temperature can only be interpreted as being due to vasoconstriction. If this work is verified it would seem that even if tobacco smoking should not be proved to be the direct cause of thrombo-angiitis obliterans, it is certainly an unfavorable influence and in a case with markedly limited blood supply or with an acute exacerbation, it might turn the scales in favor of gangrene or other trophic lesions. Tobacco also might be deleterious in other peripheral vascular disturbances both vasospastic and occlusive. Furthermore, if the vasoconstriction is due to sympathetic stimulation, as would seem quite possible in view of some other known effects of tobacco and nicotine, one may consider the influence of smoking on other clinical syndromes associated with an overactive or irritable sympathetic nervous system.

Purely clinical observation has tended to show that some patients with thrombo-angiitis obliterans seem to improve and have a more benign course if they stop smoking. There are too many exceptions to incriminate tobacco smoking as the sole etiologic agent, but, considering present knowledge, it seems reasonable to indict it as at least an unfavorable influence. One should strongly insist, although it is often futile, that patients suffering from thrombo-angiitis obliterans discontinue using tobacco completely and permanently.

Nelson W. Barker, M.D.

FEVER THERAPY IN NEUROSYPHILIS

The suggestion of Wagner von Jauregg, made more than ten years ago, that inoculation with Plasmodium vivax would offer results in the treatment of general paresis that had not been accomplished by other methods of treatment was a revolutionary idea in antisyphilitic therapy. The results which he reported in his first publication have been substantiated in a large series of cases by observation now for almost a decade. However, the successful results obtained with this treatment of a heretofore extremely resistant complication of syphilis are by no means the outstanding results of Wagner von Jauregg's suggestion, for it has been shown that malaria therapy is not only the most effective means available of treating general paresis but that it is even more efficient in preventing the development of general paresis in cases of neurosyphilis. Accordingly, patients who have undergone intensive treatment for neurosyphilis with the arsenicals, mercury, and bismuth, and who have failed to show a satisfactory serologic response, are ideal candidates for treatment with malaria therapy.

Experience with malaria therapy also has called to the attention of syphilologists the fact that the individual's "resistance mechanism" to syphilis, a factor which was lost sight of in the enthusiasm attendant on the introduction of arsphenamine, is of decided importance in the outcome of neurosyphilis. Hence, renewed efforts to stimulate this defensive mechanism have been the outgrowth of the treatment with malaria therapy. A variety of fever-producing agents, including vaccines and electrical fever-producing machines, have been developed. Electric appliances such as superdiathermy and radiothermy machines or electric blankets offer the advantage that patients can be treated by physicians who see only an occasional patient with neurosyphilis, that the degree, duration, and frequency with which the fever is produced may be more easily controlled, and that the treatment may be given almost at will. These advantages apply to all forms of electric fever-producing methods. Neither method, however, is without risk, since in cases in which the central nervous system is involved the deleterious effects on the heat-controlling centers of the nervous system are no more readily prevented when these electric measures are employed, than they are when malaria therapy is used. It is difficult to administer the electric treatments to the patient whose disease is not sufficiently advanced for the mental disturbances of general paresis to have been exhibited. The demented patients can be readily treated by forceful measures, whereas the patient who has not yet reached the stage of general paresis, as a rule objects rather strenuously to the ordeal of having his temperature raised by electricity. There is an additional factor which further observation may or may not support, and that is, remissions from fever therapy are less frequent and not quite as complete following the electric method of producing fever as they are from malaria therapy. In justice to these electric methods, however, a decade must elapse before concrete opinions will be available as to their

value. Just as with malaria therapy, time and observation of the results of treatment in a large series of cases are essential in determining the good as well as the bad effects of these electric fever-producing agents.

PAUL A. O'LEARY, M.D.

CORRECTION

On page 227 in the April issue of MINNESOTA MEDICINE in an article on "Carcinoma of the Esophagus" by Dr. E. C. Bartels, the word "without" was used in describing Jackson's method of dilatation of the esophagus. The sentence should have read: "The blind method of dilatation as used by Jackson with the esophagoscope is hazardous and should be avoided."

OF GENERAL INTEREST

Dr. H. T. Sherman, formerly of Grand Meadow, Minnesota, is now located in Bellingham, Minnesota.

Dr. Leo M. Crafts, Minneapolis, has recently been notified of his appointment as a member of the Advisory Council of *The Living Age,* which has just been established by the Editorial Board of that periodical.

Harold E. Hullsiek, St. Paul, addressed a joint meeting of the Redwood-Brown County Medical Society and the Union Hospital Staff of New Ulm at the hospital, April 4, on the subject of Rectal Diseases.

Dr. Henry E. Michelson, Minneapolis, delivered the address before the annual meeting of the Wayne County Medical Society, in Detroit, Michigan, on April 18, 1933. The subject of his discussion was "Cancer of the Skin."

A special bus fare of $2.35 for the round trip is offered by the Jefferson Transportation Company to physicians and others from the Twin Cities attending the State Society meeting at Rochester, May 22, 23 and 24. This rate is offered only if a special bus is reserved seating thirty-three persons and filled to capacity.

At a recent meeting of the New York State Medical Society at the Waldorf Astoria Hotel in New York City, Dr. H. Hamilton Cooke of Lowville, New York, was awarded the annual medal and prize for his thesis on "A Pathological, Experimental and Clinical Consideration of Lipoid Deposits in the Gallbladder."

Dr. Cooke formerly lived in Hutchinson, Minnesota, and was a Fellow in Surgery at the Mayo Clinic, Rochester.

Dr. Charles R. Drake of Minneapolis is among the list of those in line for nomination, May 8, as a member of the Board of Education of Minneapolis. As a physician Dr. Drake is particularly interested in public health measures as well as education in general. The interest of physicians in public activities of this sort is commendable.

Donald A. Laird, director of the psychological laboratory of Colgate University, has been appointed to supervise the exhibit on sleep and fatigue for the Century of Progress Exposition, opening at Chicago in June. The exhibit, which is being supported by the Master Bedding Makers of America, will feature the actual use of apparatus used on recent studies of sleep and fatigue at several universities, giving visitors an opportunity to take some of the tests. It is expected to accumulate in this way a mass of data bearing on the diurnal course of fatigue.

The following amendments to the constitution of the Minnesota State Medical Association were passed by the House of Delegates of that body at the annual meeting in St. Paul in May, 1932. Under a provision of the constitution these amendments will go into effect one year after their passage, following the 1933 meeting of the State Association.

Article IV, Section 4: Affiliate members should be those members of component districts or county medical societies, who upon their own request, and having held membership for a period of twenty-five years in this Association, and having reached the age of seventy years, or who through physical disability are unable to engage in active practice, and who shall have been declared affiliate members of their own district or county medical society at its regular meeting, such action having been approved by the Council.

Article V: House of Delegates: The House of Delegates shall be the legislative and business body of the Association and shall consist of (1) Delegates elected by the component county and district societies, (2) Councilors, (3) The President, (4) The President-Elect, (5) Ex-officio Secretary and Treasurer, (6) Past Presidents who shall be entitled to the privileges of the floor but without the right to vote.

Article VI: Council—The Council shall consist of the Councilors, the President, the President-Elect, the immediate Past President, and ex-officio the Secretary and the Treasurer. Besides its duties mentioned in the by-laws, it shall constitute the Finance Committee of the House of Delegates. A majority of Councilors shall constitute a quorum.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

EX-NATUROPATH AND PHYSICAL CULTURIST SENTENCED TO WORKHOUSE

State of Minnesota *vs.* Mitchell Judry

On March 29, 1933, Judge Levi M. Hall, of the Hennepin County District Court, sentenced Mitchell Jurdy, twenty-eight years of age, to serve six months in the Minneapolis workhouse. Judge Hall refused to suspend the sentence because of the fact that Jurdy has a previous conviction for a similar offense committed in Minneapolis in 1932.

Jurdy was tried before a jury which deliberated only forty-five minutes in bringing in its verdict of guilty. At the time of his arrest Jurdy was located at the Rosedale Hospital, 4429 Nicollet Ave., Minneapolis. The complaint against Jurdy charged him with prescribing and suggesting a form of treatment for Mrs. Katherine Auge, 2835 Central Ave. N. E., Minneapolis. Mrs. Auge paid Jurdy and the Rosedale Hospital a total sum of $158.00. Mrs. Auge has been suffering for sometime from Hodgkin's disease. Dr. C. C. Carpenter, a licensed physician, testified on behalf of the defendant, that he was the physician in charge of the Rosedale Hospital, and that Mrs. Auge was his (Dr. Carpenter's) patient. This was vehemently denied by Mrs. Auge. The testimony disclosed that Mrs. Auge was placed upon an orange juice diet and given light ray treatments and some massage. The treatments lasted a period of fourteen days.

On February 19, 1932, Jurdy pleaded guilty to a similar offense and received a suspended sentence of one year in the Minneapolis workhouse. While he was on probation the present case occurred. Jurdy has professed to be a naturopathic physician and physical culturist.

The investigation of this case was handled by the Minnesota State Board of Medical Examiners in cooperation with the Better Business Bureau of Minneapolis. Judge Levi M. Hall, before whom the trial was had, presided over the same in a very fair manner. The defendant was accorded his rights and at the same time a fair instruction was given to the jury by Judge Hall in reference to the law on this subject.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Costs of Medical Insurance

One of the unfortunate by-products of the widely published majority report of the Committee on the Costs of Medical Care has been the emergence of a large number of commercial schemes for health insurance.

This development was foreseen at the time of the publication of that report and the public was duly warned. Physicians, having been put in the light of selfishly interested parties, cannot expect that their warnings will be universally heeded.

So far, the lay promoters have been halted to some extent by the ruling of the attorney general's office that health insurance is subject to the same laws that regulate life insurance.

Early in April, however, a new company calling itself the Pioneer Mutual Health and Benefit Insurance Company opened "home offices" in the New York Building in Saint Paul with R. H. G. Whatley, president; Sidney O. Lankester, vice president, and Samuel Neumann, secretary and treasurer.

The plan under which this new company is to operate, as quoted in the *Saint Paul Dispatch*, of Monday, April 10, is as follows:

"Policies will be sold to heads of families covering all dependent members of the family living under one roof.

"The services provided include medical treatment for all sickness or accidents to be given in the office of the attending physician or hospital. Necessary operations will be performed under the policies as well as necessary dentistry, the latter listed as non-gold fillings work, extractions and cleaning."

Mr. Neumann, secretary and treasurer of the company, is quoted to the effect that "medical and dental services will be given by a staff of doctors and dentists regularly maintained by the company" who will doubtless be the judges of what are and what are not "necessary operations."

Presumably this company is organized and capitalized to conform with state and federal insurance regulations. Presumably, also, its backers believe that the hiring of a staff of doctors in these hard times will be the least of its difficulties. The chances are, however, that no matter how well organized the company may be, it will be extremely difficult to hire reputable physicians.

Physicians rightly look with suspicion on any commercial scheme for providing medical care. In such cases, funds which should be spent exclusively on medical care must be made to yield profits to lay promoters. As the Bureau of Economics of the American Medical Association has repeatedly pointed out, approximately 40 per cent of the money paid by subscribers for all such medical insurance schemes goes, not for medical and hospital care at all, but to cover overhead of organization, salaries of salesmen, profits on investment.

The physician can see no adequate reason for making such costly experiments when better care at lower costs can be had directly from a well qualified physician. He must reckon, however, upon an unusually susceptible public and upon a continuous newspaper propaganda favoring reorganization of medical practice which nicely paves the way for commercial sorties into the medical field.

Certainly it should be the responsibility of the organized medical profession to protect the public against questionable schemes of medical insurance.

Four outstanding speakers will discuss the situation of the doctor and of medical practice at the 80th Annual Meeting of the State Society at Rochester on the evenings of Monday and Tuesday, May 22 and 23. They are Morris Fishbein of Chicago, Archbishop John Gregory Murray of Saint Paul, Dean Lewis of Baltimore, president of the American Medical Association, and N. O. Pearce of Minneapolis, president of the State Society. These discussions, as well as the scientific sessions of the 22nd, 23rd, and 24th (for details see the program printed elsewhere in this issue), should be of great importance to every man who is practising medicine.

MISCELLANEOUS

AN AVOCATION FOR THE MALE CARDIAC INVALID

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This note is on therapy, psychotherapy perhaps, for application to the severely ill, but still ambulatory, adult, male, cardiac invalid who before his illness was an ardent follower of competitive sport. Although I have had the suggestion in mind for several years, ever since a pathologist who is an expert rifleman introduced me to a highly technical and satisfying hobby, I have not presented it. However, I have now been urged to do so by a well known cardiologist.

The patient with an injured heart, who has gone through the period of rest and other treatment recently recommended by Kilgore,* in time is likely to be allowed to walk about. Then, if he has been a sportsman, he will see little to live for. Golf, fishing of any interest, game fishing, even trap-shooting are over for him. All are too fatiguing. Bridge and checkers will pall on a formerly physically active man. Mental depression tends to descend on him, and he will be likely to give up his life in a burst of rebellion against the regimen, unless he can be provided with a manly, competitive, out-of-door sport.

An article by Roberts,† although it was not written with the invalid in mind, contains the solution. It is rifle shooting from a bench rest. Shooting in the four standard positions, standing, kneeling, sitting, and prone, would not do for the patient with heart disease although it might do for persons with less serious chronic illnesses. These positions are fatiguing. However, in shooting from a bench rest the patient sits on a chair, before a table built with an "L" shaped jog in one end (Fig. 1). His arms rest on the table, his thorax is supported by the limbs of the "L" shaped jog, the barrel of the rifle is supported by the muzzle rest. The only way the patient conceivably can injure himself is by holding his breath too long before squeezing the trigger. He can guard against this remote hazard and will be inclined to do so if he can be kept cheerful.

In shooting a rifle in this way, the patient who now is a rifleman and again a sportsman, converts himself into a part of what riflemen call a machine rest, in so far as he can. The fact that he is not a machine, however, is where the enjoyment comes in. The modern 22 caliber target rifle, which is as large an arm as the patient should use, is a scientifically accurate instrument that will bring joy to any sportsman's heart. To him it is a beautiful object and the physician can be assured that it has practically no recoil. The ammunition that has been developed for this rifle is both accurate and cheap. However, with all these refinements, both rifles and ammunition are made by men and are used by men under varying conditions of range, light, and wind velocity. Let the rifleman spend a fortune on micrometer sights, telescopes, special barrels, stocks, actions, and loads, whatever he does his score will never become uniformly perfect. He will shoot differently from day to day, for no discernible reason, and if he should get too expert to suit himself, he need only change his rifle, his range, his sights, or his ammunition to find a new set of problems facing him.

In fact, no man can master, in a lifetime, all there is to know about rifles and rifle shooting. There is reading, study and light bench work enough to occupy the rainy days, and not any man who masters even a little of the knowledge and technic that centers about the rifle need ever be lonely. There is a national organization of riflemen, and riflemen in any community soon become acquainted. The talk among them is endless, some of it very technical indeed, and conducive to anything but introspection.



Fig. 1. Shooting from a bench rest. (Courtesy The American Rifleman.)

The physician need not feel hesitant about presenting these views, even to a former sportsman, for many out-of-door men are not acquainted with rest shooting nor with new developments in small caliber rifles and ammunition.

*Kilgore, E. S.: Treatment of acute coronary occlusion. Jour. Am. Med. Assn., 100:315 (Feb. 4), 1933.

†Roberts, N. H.: Rest shooting. American Rifleman, 81:5 (Feb.), 1933. Submitted for publication April 15, 1933.

HOSPITALESE*

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There are three entirely ethical ways in which a physician can make himself and his work known to his confreres and to the public: He can develop his skill and knowledge in some one or several lines to the point where his success as a healer will be so outstanding that his fame will spread from mouth to ear; he can prepare himself to talk so interestingly and instructively on one or several subjects that his services as a speaker, in person or over the air, will be eagerly sought; or he can embody his researches, experiences or cogitations in written articles, for publication in the professional or lay press. For most men, the last-named method is the easiest, but even that is no God-given endowment. It requires real and sincere study and work.

While it is quite obvious (especially to foreigners who are trying to learn it) that the English language contains many inconsistencies of spelling, pronunciation and construction, the fact remains that, when it is thoroughly known and used with intelligence and discrimination, it is one of the most flexible and elegant methods for conveying ideas from one man to another.

Physicians are supposed to be—and very generally

*Reprinted by permission from the *Medical Mentor*, January, 1932.

are—educated and cultured men, and their spoken communications, as a rule, substantiate this supposition; but when nine out of ten medical men sit down to write a professional article, they appear to forget that they have ever had any training or practice in grammatical construction and lapse into a dialect that is in the class with the argot of the yeggs and hijackers.

In writing up a medical history, in the wards of a hospital or in the office, the busy intern or practitioner finds it convenient to employ certain symbols and abbreviations which are fully understood by himself and by the other physicians and nurses who may have occasion to consult these records. Such notations are not supposed to be English, but merely a form of time-saving shorthand, which serves its purpose excellently.

This is all well and good—until some ambitious man, with a proper and highly laudable desire to see his name and the results of his labors in print, attempts to embody the data from these case records in an article, and feels that he has done so when he has made verbatim copies of the data on the charts. Then the stuff is a mess.

Some misguided would-be authors seem to feel (obviously they do not *think*) that the way to write a technical paper is to leave out all of the articles, prepositions and conjunctions and most of the adjectives, as well as the predicates of about half of the sentences, and to use as many abbreviations as possible. B.M.R., C.A.C., t.i.d., T.A.T., R.O.A., and similar cabalistic signs will do for history sheets, but not for the pages of a high-class medical journal, unless the words they represent are to be used frequently in the same paper, and they should be written out in full the first time and followed by the abbreviation in parentheses, after which the latter may be used alone.

We have all heard wise and able men, who should have (and no doubt did) known better, in the course of a line of shop-talk in the scrub-up room, make observations like this: "He had no temperature and his Wassermann was negative, so I operated the case and removed the pathology." This is not English: It is hospitalese.

When such a melange of shocking barbarisms is emitted in the course of more or less intimate dialogue, there may possibly be some *excuse* (though there is never any sound *reason*) for it, even though it corrupts the speech, and with it the thinking, of younger men who may hear it. But when such examples of mangled syntax are permitted to appear in formal addresses or articles, there is neither reason, excuse nor any possible justification for such a lazy, sloppy and wholly reprehensible practice.

Everything not at absolute zero (minus 273° Centigrade) has *temperature,* so every human being has a good deal of it. A sick man may have an *elevation* of temperature above the normal, which is simply and properly called *fever.*

There is no such object in nature nor concept in philosophy as *a wassermann.* There was once a *Doctor* Wassermann, whose test for syphilis is widely used and whose name is properly applied, as an *adjective,* in describing the *test.*

One may *operate* a jig-saw or a peanut roaster, but not a man. A surgeon can operate *upon* a *patient,* not upon a *case,* which latter word is merely an abstract symbol denoting a particular instance or example of some disease or morbid process.

Pathology is the science or study of the nature and results of disease—an intellectual concept; not a material object which can be seized with forceps and ablated with a scalpel. It is ridiculous to say "The lungs showed pathology," as it would be to remark that the throat contained laryngology or the bladder urology. The organs may show *pathologic changes* or *lesions.*

Following up this last line of thought, it is an equally loose locution to speak of the body as containing or exhibiting *chemistry* (another science). Blood chemistry, for example, is an abstract idea and cannot "show" anything; though blood-chemistry *studies* can, and often do, give us valuable information. Serology is still another science, and can no more be "positive" or "negative" than can arithmetic. Those terms are properly applied to serologic *findings.*

Launching a general attack upon a few of the most popular and pernicious errors of form and construction which one hears in medical talks and sees in professional journals, "tubercular" means, characterized by the presence of nodules (we may have tubercular leprosy). An individual infected with the tubercle bacillus is *tuberculous.*

The words cystoscope, urethroscope, larynoscope and such are *nouns,* symbolizing certain surgical instruments, and to use them as verbs is a shameful exhibition of professional provincialism. It is as ludicrous to say that a patient was "cystoscoped" (or "x-rayed," for that matter) as it would be to declare that he was "speculumed" or "scalpeled."

The appendix, the abdomen and the frontal sinus are definite, objective parts of the human body. They may be large or small, normal or abnormal; but they can *never* be "acute" or "chronic," as these latter terms refer to *processes* or *diseases,* not to organs. One is liable to suffer from acute *appendicitis*—never from an acute appendix (or abdomen or frontal sinus).

Diabetic, prostatic and neurotic are *adjectives,* like ecstatic and parabolic, and it is very doubtful if there is ever any justification for using them as substantive nouns. It is far better practice to speak of a diabetic, prostatic or neurotic *patient.* "Diabetic surgery"—meaning operations upon diabetic patients—is entirely beyond the pale, being not at all analogous to "prostatic surgery" which, *properly used* means surgery upon the *prostate gland.*

Intravenous, intramuscular and hypodermic are *adjectives,* properly applied to various types of parenteral injections, and should *never* be used to describe the drugs so administered (as "intravenous iron") nor as substantive nouns. There is no more justification for saying "a hypodermic of morphine" than there would be for "an intravenous of arsphenamine." For a physician to speak of any type of parenteral injection as "a shot," in any except the most utterly informal circumstances, should be enough to insure the revocation of his license to practice.

Many more examples of medical solecisms, provincialisms, lazyisms and other types of professional jargon and hospitalese could be adduced, but these should be sufficient to set any perspicacious man thinking and turn him from his evil ways (if any) to the dictionary, the thesaurus and the textbooks of grammar and rhetoric.

Heywood Broun is quoted as having said that the essence is more important than the form. If that is true, a correspondent of the *Chicago Tribune* remarks, then Mr. Broun should not find fault if a man says, "If I'd a knowed I coulda rode I'd a went. But if I'd a went I couldn't of et."

That may seem like an exaggerated instance, but considering the difference, in educational and environmental background, between the perpetrator of this horrible example of cruelty to the English language and the average physician, the things that editors find in certain manuscripts (some of which even leak through into the printed pages) are just as bad.

The man who aspires to achieve any degree of fame as a medical writer should familiarize himself, not only with the principles of English grammar and composition, but also with the usages employed by the *best* writers in this field, and should avoid, as he would a pestilence, any tendency to lapse into hospitalese.

—*Medical Mentor,* January, 1932.

OBITUARY

John Archibald Cameron
1869–1933

Dr. John Archibald Cameron, prominent St. Paul physician, died Tuesday, April 4, 1933, in his home, from a heart attack. He was the husband of Jane Holland Cameron, noted singer. Dr. Cameron, who had practiced medicine in St. Paul since 1902, had suffered a heart complaint for about six months. A Scottish Rite Mason, Dr. Cameron also was a member of the Ramsey County Medical Society, Minnesota State Medical Association, and the Minnesota College of Surgery. He was a member of Alpha Kappa Kappa fraternity. Besides Mrs. Cameron he is survived by a son, Holland, a daughter, Phyllis Jane, and two sisters, Mrs. Anna Wheeler of Devils Lake, N. D., and Mrs. Margaret Nieland of California.

Godfrey Deziel
1861–1933

Dr. Godfrey Deziel, aged seventy-one, practicing physician in Minneapolis for forty-five years, died Monday, March 27, 1933, at St. Andrew's Hospital Dr. Deziel was born in Ontonogan, Michigan. He was a member of the Minneapolis Athletic Club and the St. Anthony Commercial Club, and was physician for Aerie No. 1247, Fraternal Order of Eagles. Dr. Deziel is survived by his wife, a daughter, Mrs. Stephen Darling of Appleton, Wisconsin; a grandson, Stephen D. Darling of Appleton; a brother, Henry Deziel, and a sister, Mrs. Ambrose Jubert.

Clarissa Clay Richardson

Dr. Clarissa Clay Richardson, herself a physician and the wife of Dr. Harold E. Richardson, St. Paul, died Sunday, April 16, 1933. Besides her husband, she is survived by a daughter, Ann Marie, and an infant son.

Mrs. Richardson was a former resident of Minneapolis. She obtained her medical degree at Creighton University in Omaha in 1917 and served her interneship in St. Mary's Hospital, Duluth.

She had been an assistant city physician in Minneapolis, serving at General Hospital, and a resident physician at the State School for Feeble Minded in Faribault. She was married in 1919 and ceased practice in 1920.

WILLIAM PEPPER

William Pepper began life under conditions which are very often unfavorable to success. His father, a distinguished physician, the Professor of Medicine in the school in which his son was educated, belonged to a family of position and influence. For the young man there were none of those tempering "blows of circumstance," no evil star with which to grapple and grow strong. Quite as much "grit" and a much harder climb are needed to reach distinction from the top as from the bottom of the social scale, and to rise superior to the *res abundans domi* has taxed to the uttermost many young men in this country. We have heard enough of the self-made men, who are always on top; it is time now to encourage in America the young fellow who is unhappily born "with a silver spoon in his mouth." Like the young men in the Gospels, he is too apt to turn away sorrowfully from the battle of life, and to fritter away his energies in Europe, or to go to the devil in a very ungentlemanly manner, or to become the victim of neurasthenia. To such the career I am about to sketch should prove a stimulus and an encouragement.—Counsels and Ideals from the Writings of William Osler.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of May will be as follows:

May 3—Child Health—A Challenge.
May 10—Galvanic Mouth Burns.
May 17—Medicine of the Aborigines.
May 24—Dementia Præcox.
May 31—Periodic Health Examination of Women.

RED RIVER VALLEY SOCIETY

Ulcers of the Stomach and Duodenum was the subject for discussion at the spring meeting of the Red River Valley Medical Society held at the Hotel Crookston, April 11, 1933. Dinner for members of the society and for the Women's Auxiliary preceded the meeting. The following doctors participated in the scientific discussion: W. F. Mercil, Crookston; O. E. Locken, Crookston; J. F. Normal, Crookston, and Edward Bratrud, Thief River Falls.

RICE COUNTY SOCIETY

The Rice County Medical Society met Thursday. April 20, 1933, in Northfield. R. E. Scammon, Dean of Medical Sciences at the University of Minnesota, talked on The Relation of the University Hospital to the Medical Profession. Mr. J. M. Sweitzer of the Employers' Mutual Liability Insurance Co. talked on Workmen's Compensation as it Affects Medical Practice. Mr. F. M. Brist, attorney for the State Board of Medical Examiners, spoke on Recent Activities of the Board of Medical Examiners. Mr. Brist also reviewed the work of the Legislative Committee of the State Association.

WABASHA AND WINONA COUNTY SOCIETIES

There were twenty-six in attendance at the annual dinner and joint meeting of the Wabasha and Winona County Medical Societies, held at Buena Vista Sanatorium, Wabasha, on Monday evening, April 10, 1933.

Dr. R. E. Scammon talked on "Your University Medical School and Hospital," and "Guild Medicine," Dr. N. O. Pearce, president of the State Medical Association, spoke on "Some Problems of Our Profession," and Mr. F. Manley Brist discussed the activities of the State Board of Medical Examiners and the work done by the Committee on Legislation of the State Medical Association at the Capitol this winter.

Lay members of the Bi-County Tuberculosis Commission were included among the invited guests.

PROFESSIONAL SENSITIVENESS

More perhaps than any other professional man, the doctor has a curious—shall I say morbid?—sensitiveness to (what he regards) personal error. In a way this is right; but it is too often accompanied by a cocksureness of opinion which, if encouraged, leads him to so lively a conceit that the mere suggestion of mistake under any circumstances is regarded as a reflection on his honor, a reflection equally resented whether of lay or professional origin.—Counsels and Ideals from the Writings of William Osler.

MINNESOTA STATE MEDICAL ASSOCIATION
EIGHTIETH ANNUAL SESSION . . . MAY 21-24, 1933
ROCHESTER, MINNESOTA

Business Program

Sunday Afternoon, May 21

12:30—Council.....University Club
2:00—Reference Committee.....University Club
7:00—House of Delegates.....Sun Room
11:00—Council.....University Club

Tuesday Morning, May 23

12:00—House of Delegates.....Kahler Hotel (Luncheon)
1:45—Council.....University Club

Wednesday Morning, May 24

General Assembly
Nurses' Home, St. Mary's Hospital
10:00—Presentation of Officers.....Auditorium

Reference Committee

F. H. MAGNEY.....Duluth
W. F. BRAASCH.....Rochester
J. C. HULTKRANS.....St. Paul
C. A. MCKINLAY.....Minneapolis
C. L. SCOFIELD.....Benson

Scientific Program

Monday Morning, May 22, 1933

TRUDEAU SOCIETY

Room G 14, St. Mary's Hospital—9:00 A. M.

Presiding Officers:

President: A. T. Laird Secretary: D. R. Hastings

Pathology of Tuberculosis—H. E. Robertson, Rochester
Childhood Tuberculosis—J. A. Myers, Minneapolis
Pulmonary Tuberculosis: General Treatment—E. S. Mariette, Oak Terrace
Pulmonary Tuberculosis: Surgical Treatment—S. W. Harrington, Rochester
Control of Tuberculosis in Minnesota—A. J. Chesley, Minneapolis
Control of Tuberculosis: National and International—John H. Peck, President, National Tuberculosis Association, Des Moines

HEART ASSOCIATION

East Hall, Nurses' Home—9:00 A. M.

Presiding Officer:

President: Frank J. Hirschboeck

Life History of a Patient with Mitral Stenosis. Complications of the Final Stage: Autopsy Findings—(Lantern)—C. N. Hensel, St. Paul
The Treatment of Some Common Heart Disorders—A. R. Barnes, Rochester
Paroxysmal Tachycardia and Associated States—E. L. Tuohy, Duluth
The Production of the Electrocardiogram—(Cinema)—F. A. Willius and A. R. Barnes, Rochester
The Influence of Gravity on the Circulation—Frederick Scott, Minneapolis
Case Reports—T. A. Peppard, Minneapolis
Adiposity of the Heart—F. A. Willius and H. L. Smith (by invitation), Rochester

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

University of Minnesota

Room G-15, St. Mary's Hospital—9:00 A. M.

Occiput Posterior: Lantern Slide Demonstration and Lecture—G. E. Hudson, Minneapolis
Version with Manikin Demonstration—L. W. Barry, St. Paul
Myomata of the Uterus—J. A. Urner, Minneapolis
Modern Idea of the Etiology and Treatment of Abortions—J. C. Litzenberg, Minneapolis

MINNESOTA SURGICAL SOCIETY

Auditorium, Nurses' Home—9:00 A. M.

Presiding Officers:

President: T. J. Kinsella Secretary: V. P. Hauser

The Treatment of Burns—James Morrow, Austin
Chronic Intussusception of the Gastro-Intestinal Tract: Report of 39 Cases—C. W. Mayo, Rochester
Retrograde Intussusception of the Jejunum Through a Gastro-Enterostomy Stoma—T. J. Kinsella, V. K. Funk, and Charlotte C. Van Winkle, Oak Terrace
Carcinoma of the Rectum—C. F. Dixon, Rochester
Results of the Treatment of Bladder Tumors—V. S. Counseller, Rochester
Therapy of the Artificial Menopause—R. J. Moe, Duluth
Presentation of Three Cases—Lipoma of Joint Capsule with Successful Removal—R. K. Ghormley, Rochester
Sterility and Fertility in the Menstrual Cycle (with demonstration of a new slide rule)—J. M. Culligan, St. Paul
Restoration and Conservation of Renal Function Following the Removal of Obstructing Lesions—Waltman Walters, Rochester

TABLE DEMONSTRATIONS

Nurses' Home—11:00 A. M.

East Hall

Practical Points in the Treatment of Rectal Disorders—L. A. Buie, Rochester
Animated Drawings of the Origin and Surgical Management of Anal Fistula

Auditorium Stage

Physiotherapy Demonstration—Arthritis and Acute Injuries—A. U. Desjardins, P. S. Hench, and Ann Kelley, R.N., Rochester

West Hall—B-24

Complete Medical and Laboratory Examination of a Patient—W. C. Alvarez, Rochester

West Hall—B-22

Exhibit on Radiotherapy, Roentgen Rays and Radium —A. U. Desjardins and H. H. Bowing, Rochester

Presented by Section of Therapeutic Radiology, Mayo Clinic

West Hall—B-20

Treatment and Complications of Gonorrhea—A. L. Clark, Rochester

Demonstrating the diagnostic technic, including staining of slides and irrigation of patient

West Hall—Booth No. 6

Minnesota General Hospital—Relationship to the Medical Profession

West Hall—B-27

Transurethral Punch Operation—H. C. Bumpus and G. J. Thompson, Rochester

West Hall—Booth No. 24

Treatment of Acute Burns—R. K. Ghormley and E. G. Bannick, Rochester

Demonstration and Exhibit showing enlarged photographs, charts and equipment

West Hall—Booths No. 21 and 22

The Occurrence of Tularemia in Man and Animals—R. G. Green, University of Minnesota

West Hall—Booths No. 7 and 8

Professional Pharmacy as Applied to the Physicians —Under the auspices of the Inter-Professional Relationships Committee of Hennepin County.

West Hall—B-26

Differential Characteristics of Malignant Cells—W. C. MacCarty, Rochester

West Hall—B-28

Treatment of Syphilis—P. A. O'Leary and L. A. Brunsting, Rochester

West Hall—Booth No. 27

(1) The Geiger Counter and Its Application to the Measurement of the Circulation Time of the blood; (2) The Electromotive Thermometer and the Measurement of Skin Temperature; (3) Short Electric Wave (Radiothermy) Apparatus—Charles Sheard, Ph.D., Rochester

(This apparatus will be demonstrated to those who make application at the Registration Desk before 9 o'clock Monday and Tuesday)

Monday Afternoon, May 22, 1933

NORTHWESTERN PEDIATRIC SOCIETY

Auditorium, Nurses' Home—1:30 P. M.

President: Alexander Stewart Secretary: E. F. Robb

Primary Carcinoma of the Liver in 6 Months' Infant —G. K. Hagaman, St. Paul

Otitis Media in Children—E. J. Huenekens, Minneapolis

Treatment of Enuresis—H. S. Lippman, St. Paul

Intussusception—F. C. Rodda, Minneapolis

Renal Rickets—R. E. Nutting, Duluth

Fecal Incontinence and Megacolon—T. L. Birnberg, St. Paul

Evolution of Tuberculosis in the Human Body—C. A. Stewart, Minneapolis

Case Report, Arteriosclerosis—C. A. Scherer, Duluth

Care of the Premature—A. V. Stoesser, Minneapolis

Use of Chloral Hydrate in Pediatric Practice—E. D. Anderson, Minneapolis

Pyelitis—H. F. Helmholz, Rochester

Subacute Atrophy of the Liver—Woodard Colby, St. Paul

Pulmonary Abscess in Children—R. L. J. Kennedy, Rochester

RADIOLOGICAL SOCIETY

Room G 14, St. Mary's Hospital—1:30 P. M.

President: Gage Clement Secretary: Leo Rigler

Radiation Therapy in Non-Malignant Conditions—Gage Clement, Duluth

Correlative Value of Clinical and Pathological Findings in Roentgenological Diagnosis—Kano Ikeda, St. Paul

The Place of the Roentgenologist in the Private Practice of Medicine—Leo Rigler, Minneapolis

Childhood Tuberculosis—R. G. Allison, Minneapolis

MINNESOTA ORTHOPEDIC SOCIETY

Room G 15, St. Mary's Hospital—1:30 P. M.

President: Henry W. Meyerding

Secretary: John Moe

Fractures in and near Joints—E. S. Geist, Minneapolis

Bone Tuberculosis—C. K. Petter, Oak Terrace

Demonstration of Improved Clavicle Splint—M. O. Henry, Minneapolis

Old and Recent Fractures of Ankle—M. S. Henderson, Rochester

Rôle of the Soft Tissues in the Diagnosis and Treatment of Back Injuries—E. T. Evans, Minneapolis

Fractures of Humerus and Volkmann's Contracture—Henry W. Meyerding, Rochester

Stiff and Painful Shoulder—J. R. Kuth, Duluth

The Operative Treatment of Congenital Club Feet—G. A. Williamson, St. Paul

Extra-articular Fusion of the Hip Joint—W. H. Von der Weyer, St. Paul

SOCIETY OF NEUROLOGY AND PSYCHIATRY

Auditorium, Nurses' Home—3:45 P. M.

President: R. S. Ahrens Secretary: G. R. Kamman

Psychoneurosis—F. W. Whitmore, St. Paul

General Paresis, W. P. Gardner, St. Paul

The Pre-Senium—G. N. Ruhberg, St. Paul

Spinal Fluid Examinations—A. S. Hamilton, Minneapolis

The Operability of Spinal Cord Tumors—W. McK. Craig, Rochester

Gait Disturbances Due to Neurological Diseases—Moving Pictures—L. R. Gowan, Duluth

ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

East Hall, Nurses' Home—1:30 P. M.

President: H. J. Rothschild Secretary: W. D. Camp

Program presented by sections on Ophthalmology, Otolaryngology, Oral and Plastic Surgery of The Mayo Clinic

Osteitis Deformans of the Bones of the Face—F. Z. Havens

Sarcoma of the Larynx—F. A. Figi

Permanent Enlargement of the Lips and Face, Secondary to Recurring Swellings and Associated with Facial Paralysis; a Clinical Entity—Gordon B. New

SYMPOSIUM ON CHRONIC SUPPURATIVE OTITIS MEDIA

Clinical Classification—W. B. Stark

Conservative Management—C. M. Anderson

Indications for Surgical Interference—H. I. Lillie

Operative Procedures—B. E. Hempstead

SYMPOSIUM ON GLAUCOMA

Changes in Vision and Visual Fields—W. I. Lillie

Differential Ophthalmoscopic Diagnosis — H. P. Wagener

Non-surgical Management—A. D. Prangen

Surgical Treatment of Diseases of the Orbit—W. L. Benedict

Monday Evening, May 22, 1933

MEDICAL ECONOMICS MEETING

Methodist Church—8 P. M.

N. O. Pearce, Chairman

Address—A. W. Adson, President Minnesota State Board of Medical Examiners, Rochester

Trend of Medical Practice—Morris Fishbein, Chicago; C. H. Mayo, Rochester

Remarks by the Legislative Committee—H. M. Johnson, Chairman, Dawson

Tuesday Morning, May 23, 1933

GENERAL ASSEMBLY

Auditorium—8:30 A. M.

Presiding Officers:

A. T. Laird, Nopeming E. M. Hammes, St. Paul

SYMPOSIUM ON NUTRITIONAL DISORDERS

The Rôle of Vitamins in Nutrition—G. O. Burr, Ph.D., Associate Professor of Botany, University of Minnesota

Skin Manifestations of Avitaminosis—S. E. Sweitzer, Minneapolis

Eye Manifestations of Avitaminosis—D. L. Tilderquist, Duluth

Systemic Manifestations of Avitaminosis — Harry Oerting, St. Paul

Treatment of Malnutrition in Adults—Moses Barron, Minneapolis

Vitamin Deficiency in Children—Philip C. Jeans, Professor of Pediatrics, University of Iowa, Iowa City

Summary—W. C. Alvarez, Rochester

11:30 A. M.

Undulant Fever — Walter M. Simpson, Director, Diagnostic Laboratories, Miami Valley Hospital; President, American Society of Clinical Pathologists, Dayton, Ohio

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TABLE DEMONSTRATIONS

East Hall—10:30 A. M.

Practical Points in the Treatment of Rectal Disorders—L. A. Buie, Rochester

Animated Drawings of the Origin and Surgical Management of Anal Fistula

Causes of Hay Fever in Minnesota—R. V. Ellis and C. O. Rosendahl, Ph.D., Minneapolis

Demonstration and exhibit by the Medical School and Department of Botany, University of Minnesota

Amphitheater, 6th Floor, St. Mary's Hospital

Methods of Anesthesia, including Spinal Anesthesia —J. S. Lundy, Rochester

Auditorium Stage

Physiotherapy Demonstration—Arthritis and Acute Injuries—A. U. Desjardins, P. S. Hench, and Ann Kelley, R.N., Rochester

West Hall—B-24

Complete Medical and Laboratory Examination of a Patient—W. C. Alvarez, Rochester

West Hall—B-27

Practical Application of Intravenous Urography—William F. Braasch, Rochester

West Hall—B-20

Treatment and Complications of Gonorrhea—A. L. Clark, Rochester

Demonstrating the diagnostic technic, including staining of slides and irrigation of patient

West Hall—B-22

Exhibit on Radiotherapy, Roentgen Rays and Radium —A. U. Desjardins and H. H. Bowing, Rochester

Presented by Section of Therapeutic Radiology, Mayo Clinic

West Hall—Booth No. 24

Treatment of Acute Burns—R. K. Ghormley and E. G. Bannick, Rochester

Demonstration and Exhibit showing enlarged photographs, charts and equipment.

West Hall—Booths No. 21 and 22

The Occurrence of Tularemia in Man and Animals—R. G. Green, University of Minnesota

West Hall—Booths No. 7 and 8

Professional Pharmacy as Applied to the Physicians —Under the auspices of the Inter-Professional Relationships Committee of Hennepin County

West Hall—B-26

Liver Function Tests—T. B. Magath, Rochester

West Hall—B-28

Treatment of Syphilis—P. A. O'Leary and L. A. Brunsting, Rochester

West Hall—Booth No. 27

(1) The Geiger Counter and Its Application to the Measurement of the Circulation Time of the Blood; (2) The Electromotive Thermometer and the Measurement of Skin Temperature; (3) Short Electric Wave (Radiothermy) Apparatus—Charles Sheard, Ph.D., Rochester

(This apparatus will be demonstrated to those who make application at the Registration Desk before 9 o'clock Monday and Tuesday)

West Hall—Booth No. 6

Minnesota General Hospital—Relationship to the Medical Profession

Tuesday Afternoon, May 23, 1933

GENERAL ASSEMBLY

Auditorium—1:45 P. M.

Presiding Officers:

A. T. Laird, Nopeming J. C. Masson, Rochester

CLINICS

Dislocations—Dean Lewis, Professor of Surgery, Johns Hopkins University School of Medicine;

President, American Medical Association, Baltimore
Surgery—E. S. Judd, Rochester
Urology—H. L. Kretschmer, Clinical Professor of Surgery, Rush Medical College, Chicago
Pediatrics—Irvine McQuarrie, Minneapolis
Neuro-Surgery—A. W. Adson, Rochester
Medicine—Frank J. Hirschboeck, Duluth

SCIENTIFIC CINEMA

Room G 15—8:45 A. M.

J. G. Mayo, Chairman
L. A. Julin, Technical Supervisor
M. W. Else, Projection Supervisor

Thyroidectomy—C. F. Dixon, Rochester
Cardiac, Vasomotor, and Respiratory Phenomena with an Analysis of the Signs and Symptoms of Experimentally Raised Intracranial Pressure—(Talkie) Courtesy of Petrolagar Company
Teaching Film for Undergraduate Neurology—J. C. McKinley, Lecturer and Producer, University of Minnesota
Anatomy of the Female Pelvis and Perineum—(Talkie) Courtesy of Petrolagar Company
Mayo Vaginal Hysterectomy and Perineorrhaphy—V. S. Counseller, Lecturer and Producer, Rochester
Roentgeno-cinematic Pictures of the Movements of the Stomach—Cesare Gianturco, and W. C. Alvarez, Lecturer and Producer, Rochester
Increased Frequency of Winking and the Contraction of the Orbicularis Oculi and Associated Facial Muscles in Exophthalmic Goiter; Motion Picture Demonstration—W. A. Plummer and E. H. Rynearson, Lecturers and Producers, Rochester
Living Sutures in Repair of Hernia—J. C. Masson, Lecturer and Producer, Rochester

SCIENTIFIC CINEMA

Room G 15—1:30 P. M.

Vaginal Hysterectomy for Uterine Prolapse—(Talkie) Courtesy of Petrolagar Company
A Practical Method of Filming Surgical Procedure Available to Everyone—L. A. Julin, Lecturer and Producer, Rochester
(1) Posterior Polya Resection of the Stomach for Benign and Malignant Lesions; (2) Billroth No. 1 for Gastric and Duodenal Lesions—Waltman Walters, Lecturer and Producer, Rochester
Eye Operations. Cataract; Glaucoma; Enucleation with Fat Implant; Magnet Operation, etc.—C. N. Spratt, Lecturer and Producer, Minneapolis
(1) Intratracheal Anesthesia; (2) Sacral Block Anesthesia, Part II; (3) Pulmonary Ventilator; (4) Spinal Anesthesia—J. S. Lundy, Lecturer and Producer, Rochester
Traumatic Surgery of the Extremities—H. W. Meyerding and R. K. Ghormley, Lecturers, Rochester; Davis & Geck, Producers, Brooklyn, N. Y.

Tuesday Evening, May 23, 1933

Methodist Church—8:00 P. M.

Presiding Officer: W. J. Mayo

Address of Welcome—G. B. Eusterman, President Olmsted-Houston-Fillmore County Medical Society, Rochester
President's Address—N. O. Pearce, Minneapolis
Address by President-Elect
The Women's Auxiliary—Mrs. A. A. Passer, President-elect, Olivia
The Medical Profession versus Racketeering—His Excellency, John Gregory Murray, Archbishop of the Diocese of St. Paul
Address—Dean Lewis, President American Medical Association, Baltimore

9:00 P. M.—Reception—Mayo Clinic

Wednesday Morning, May 24, 1933

GENERAL ASSEMBLY

Auditorium—8:30 A. M.

Presiding Officers:

J. C. Masson, Rochester R. E. Swanson, Minneapolis

SYMPOSIUM ON EMERGENCY SURGERY

Farm Accidents—M. O. Oppegaard, Crookston
Auto Accidents—Kenneth Bulkley, Minneapolis
Industrial Accidents—Paul H. Kelly, St. Paul
Emergency Surgery of the Abdomen—M. G. Gillespie, Duluth
Emergency Surgery in Infants and Children—O. S. Wyatt, Minneapolis
Strangulated Hernia—George A. Geist, St. Paul
Presentation of Officers
Citizens Aid Society Memorial Address—James Ewing, Director, Memorial Hospital, Professor of Oncology, Cornell Medical School, New York
Do's and Don'ts of the Injection of Varicose Veins—H. O. McPheeters, Minneapolis
Over 5,000 Mantoux Tests in Polk and Norman Counties—W. G. Paradis and O. E. Lōcken, Crookston

SCIENTIFIC CINEMA

Room G 15—9:00 A. M.

Cardiac, Vasomotor, and Respiratory Phenomena with an Analysis of the Signs and Symptoms of Experimentally Raised Intracranial Pressure—(Talkie) Courtesy of Petrolagar Company
Roentgeno-cinematic Pictures of the Movements of the Stomach—W. C. Alvarez and Cesare Gianturco, Lecturers and Producers, Rochester
Living Sutures in Repair of Hernia—J. C. Masson, Lecturer and Producer, Rochester
Mayo Vaginal Hysterectomy and Perineorrhappy—V. S. Counseller, Lecturer and Producer, Rochester
(1) Posterior Polya Resection of the Stomach for Benign and Malignant Lesions; (2) Billroth No. 1 for Gastric and Duodenal Lesion—Waltman Walters, Lecturer and Producer, Rochester
Traumatic Surgery of the Extremities—H. W. Meyerding and R. K. Ghormley, Lecturers, Rochester; Davis & Geck, Producers, Brooklyn, New York

TABLE DEMONSTRATIONS

East Hall—11:15 A. M.

Practical Points in the Treatment of Rectal Disorders—L. A. Buie, Rochester

Animated Drawings of the Origin and Surgical Management of Anal Fistula

X-rays Illustrating Reaction of Human Gall Bladder to Faradic Stimulation of Stomach—E. A. Boyden

Emptying of the gall bladder in children

Amphitheater, 6th Floor, St. Mary's Hospital

Methods of Anesthesia, including Spinal Anesthesia—J. S. Lundy, Rochester

Auditorium Stage

Physiotherapy Demonstration—Arthritis and Acute Injuries—A. U. Desjardins, P. S. Hench, and Ann Kelley, R.N., Rochester

West Hall—B-24

Complete Medical and Laboratory Examination of a Patient—W. C. Alvarez, Rochester

West Hall—B-20

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Demonstrating the diagnostic technic, including staining of slides and irrigation of patient

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Exhibit on Radiotherapy, Roentgen Rays and Radium—A. U. Desjardins and H. H. Bowing, Rochester

Presented by Section of Therapeutic Radiology, Mayo Clinic

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Treatment of Acute Burns—R. K. Ghormley and E. G. Bannick, Rochester

Demonstration and Exhibit showing enlarged photographs, charts and equipment

West Hall—Booths No. 21 and 22

The Occurrence of Tularemia in Man and Animals—R. G. Green, University of Minnesota

West Hall—Booths No. 7 and 8

Professional Pharmacy as Applied to the Physicians—Under the auspices of the Inter-Professional Relationships Committee of Hennepin County

West Hall—B-27

A Study of Hypertension—N. M. Keith, H. P. Wagener and N. W. Barker, Rochester

Clinical Groups, Ophthalmoscopic Findings, Pathologic Changes in Arterioles

West Hall—B-26

Studies in Suprarenal Physiology—E. C. Kendall, Rochester

West Hall—B-28

Treatment of Syphilis—P. A. O'Leary and L. A. Brunsting, Rochester

West Hall—Booth No. 6

Minnesota General Hospital—Relationship to the Medical Profession

Luncheon Recess—12:15 P. M.

Golf Tournament—Country Club—2:00 P. M.

Scientific Exhibits

East Hall

Cancer Control in Minnesota—American Society for the Control of Cancer

Charts of distribution of cancer mortality in Minnesota and United States. Moulages of breast cancer. Photos of transillumination of breast tissue. Motion picture of growth of normal and sarcoma tissue and the effect of radium emanation on both types of tissue. Literature on cancer for physicians.

Oleothorax in Pulmonary Tuberculosis—H. Longstreet Taylor Foundation, Pokegama Sanatorium

Tuberculosis as Disclosed by X-ray of the Chest—F. E. Harrington, Minneapolis, and E. S. Mariette, Oak Terrace

108 selected x-ray transparencies of the chests of children and adults, showing demonstrable tuberculosis

Undulant Fever—Minnesota Department of Health, Division of Preventable Diseases, Minneapolis

Urethrography—M. A. Nicholson and M. J. Fiala, Duluth

X-rays of urethra showing normal and pathologic urethras. Methods used in making films. Media and special apparatus

Over 5,000 Mantoux Tests in Polk and Norman Counties—W. G. Paradis and O. E. Locken, Crookston

West Hall—Booths No. 7 and 8

Professional Pharmacy as Applied to the Physicians—Under the auspices of the Inter-Professional Relationships Committee of Hennepin County

Booth No. 15

Minnesota Public Health Association

Booth No. 14

Minnesota State Medical Association

West Hall—Booth No. 5

Minnesota State Board of Medical Examiners

Booth to be assigned

Women's Auxiliary, American Medical Association

East Hall

THE MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH

Experimentally Produced Peptic Ulcer—F. C. Mann and J. L. Bollman

Leiomyomata of the Stomach—J. H. Rieniets

Studies of Gastric Secretion—M. W. Comfort

Gastric Syphilis—G. B. Eusterman

The Significance of Hematemesis—A. B. Rivers

Ulcers of the Duodenum—H. E. Robertson

Roentgenograms of Stomach and Duodenum—B. R. Kirklin

Lesions of the Stomach—D. C. Balfour and H. I. Down

Relation of Streptococci to the Etiology of Ulcer—E. C. Rosenow

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Roentgenologic Study of Interesting Lesions in Childhood—R. L. J. Kennedy and J. D. Camp

The Management of Permanent Colostomies and Ileostomies—J. A. Bargen

Pathologic Conditions of the Jaws—Gordon B. New, F. A. Figi and H. F. Havens

UNIVERSITY OF MINNESOTA

Causes of Hay Fever in Minnesota—R. V. Ellis and C. O. Rosendahl, Ph.D.

Exhibit by the Medical School and Department of Botany, University of Minnesota

West Hall—Booth No. 6

Minnesota General Hospital—Relationship to the Medical Profession

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The Occurrence of Tularemia in Man and Animals—
R. G. Green

Charts of occurrence; demonstration of pathological material; cultures; agglutination tests; skin tests; demonstrations of insect vectors and animal hosts

WOMAN'S AUXILIARY

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Plans will be completed soon for one of the pleasantest and the most profitable annual meetings in the history of the State Auxiliary. It is to be held at Rochester May 22, 23 and 24 in conjunction, as always, with the State Meeting of the Minnesota State Medical Association.

The outstanding event of the three days for the women will undoubtedly be the annual luncheon, Wednesday, May 24, at which Mrs. James S. Percy of Los Angeles, president of the Auxiliary to the American Medical Association, will be present as guest of honor. Sharing honors will be Mrs. James Blake, our Minnesota president-elect of the National Auxiliary, who succeeds Mrs. Percy. The occasion will be unique in the annals of the State Auxiliary.

Programs with complete details of the meetings and of the social events planned by the hostess organization, the Auxiliary to the Olmsted-Houston-Fillmore County Medical Society, will be mailed to all doctors' wives several days before the opening of the meeting.

It is to be hoped that every doctor's wife, whether or not she is a member of the Auxiliary, will attend. The meeting affords extraordinary opportunities to attend many of the distinguished scientific events arranged for the physicians, also to visit the famous libraries and museums of Rochester and to participate in a series of teas and receptions in charming Rochester homes.

(Mrs. S. H.) Laura R. Baxter.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 8, 1933

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 8, 1933. Dinner was served at 7 p. m. and the meeting was called to order at 8 p. m. by the President, Dr. C. D. Freeman. There were 55 members and 1 visitor present.

Minutes of the February meeting were read and approved.

Dr. A. S. Hamilton read the following memorial to Dr. Thomas G. Lee; and a motion was carried that it be spread on the minutes of the Academy and a copy sent to the family.

Dr. Thomas G. Lee, the last member of the original faculty of the College of Medicine of the University of Minnesota to retire from teaching service, died September 1, 1932, from injuries received in an automobile accident four days previously.

Dr. Lee was born in 1860 at Jacksonville, New York. He was graduated from the University of Pennsylvania in 1886 and held the degrees of Bachelor of Science and Doctor of Medicine from that school and, later, of Bachelor of Science from Harvard. For five years he was lecturer in Histology and Embryology at Yale University and also taught the same subjects at Radcliffe College for one year.

When the Medical School of the University of Minnesota was organized, Dr. Lee, in 1892, was given charge of the laboratory of Histology and Embryology, and also of Bacteriology and Clinical Microscopy. The latter subjects were soon turned over to other men and Dr. Lee continued as Professor in Charge of Histology and Embryology. In 1908 he became Professor and head of the Department of Anatomy and in 1913 he was made Professor of Comparative Anatomy and continued in this position until his retirement from active teaching in 1929 when he went to Florida to spend the remainder of his days.

When Dr. Lee came to the University, the Medical Department was limited in attendance and in quarters. With Dean Wulling he shared a one-story frame building, and the building that was to house the medical, dental and pharmacy departments was then in the process of erection. The medical course covered two years only.

Dr. Lee saw the Campus, and especially the medical Campus, steadily expand. He visited Europe in connection with the plans for a new Institute of Anatomy, which was completed in 1913. For years Dr. Lee was Secretary of the Medical Faculty and was Librarian of the Medical School. He taught with or under each of the University's presidents. All of his life was devoted to administration, teaching and research. He was an indefatigable worker, was especially interested in the embryology of certain mammals, published several papers on that subject, in which he was a recognized authority, and left a valuable collection behind him. During his lifetime he was a member of many scientific bodies, including the American Association for the Advancement of Science, Sigma XI, American Society of Naturalists, American Society of Zoology, American Medical Association, Minnesota Academy of Medicine, American Association of Anatomists and Anatomische Gesellschaft. He was also deeply interested in Masonry, was a Charter Member of the Acacia Masonic fraternity and was second Master of the University Lodge of the Masonic order as well as a charter member. He was President of the Council of Knights Templar of the Masonic order, as well as a charter member and a 33rd degree Mason.

Dr. Lee was a very modest man, taking little part in public life. He was a widely read man with a special knowledge of comparative and ancient religions. He enjoyed the loyalty and the affection of his colleagues and of his students. On December 21, 1887, he was married to Miss Emma Louise Shaw, of West Bloomfield, New York. Though no longer a member of our Medical Faculty, regard for his memory is joined with deep sympathy for his wife, who survives him.

(Signed) The Committee:
Arthur S. Hamilton, *Chairman,*
F. R. Wright,
S. Marx White.

Upon ballot, the following men were elected to membership in the Academy: Dr. B. S. Adams (Associate) of Hibbing; Dr. H. W. Cook (Active) of Minneapolis; and Dr. H. L. Dunn (University) of Minneapolis.

The scientific program of the evening consisted of two papers.

TRICHOMONAS VAGINALIS VAGINITIS

W. H. Condit, M.D., *Minneapolis*

ABSTRACT

It is with apology that I offer these remarks on a subject so generally discussed in recent medical literature, but I have three reasons for so doing.

First, all members of the medical profession, not excepting some with a dental degree, treat the vaginal outlet therapeutically.

Second, there are not a few in our profession who do not recognize trichomona vaginitis as a definite entity.

Third, it was my good fortune to have access to all publications by Dr. Hegner, Professor of Parasitology at Johns Hopkins University, who has done most extensive study on the Trichomonads the past six years.

Most gynecologists now recognize the condition known as Trichomonas vaginalis vaginitis as a definite entity. My interest was aroused some two years ago in an endeavor to determine why the profession has not recognized the Trichomonads present in vaginal discharges as a primary or secondary etiological factor in the one hundred years that have elapsed since the first discovery of their presence in the vagina by Donné.

The first clinical report in American literature on the treatment of vaginal discharge associated with the presence of Trichomonads was presented by DeLee in the Illinois State Medical Journal in 1920. The second report was by Greenhill before the Chicago Gynecological Society in 1928, published in the *Journal of the American Medical Association,* May 3, 1931. This last report brought many inquiries from the profession, including many gynecologists who had not recognized a single case. Mathieu, Carl Davis, N. S. Davis, Singleton and others have contributed to the literature on this subject.

Conclusions: (1) Trichomona vaginalis vaginitis, if not proven, is an accepted entity.

(2) Diagnosis and treatment of the condition will result in the cure of many annoying symptoms accompanying the vaginitis and assist in lowering puerperal morbidity.

(3) A standard treatment has not been established but recommended procedures are sufficient to yield gratifying results.

DISCUSSION

Dr. F. R. Wright (Minneapolis): There were two things in this paper which interested me. One is the statement that this germ has been found in prostatic secretion. Now prostatic secretion is obtained by holding the meatus, massaging the prostate and collecting the secretion from the urethra. Therefore, you can't tell whether bacteria in the secretion are from the prostate or from the urethra. Some dozen bacteria are found near the meatus; as you go back farther in the urethra there are fewer, and the posterior is practically always sterile. So that, if bacteria are found in prostatic secretion, there is no way of telling whether they are from the prostate or the urethra.

The other point is about the use of soap. Soap is a solvent. When it is put into the vagina it washes out the secretions. The soap which Dr. Condit speaks of is a soft soap and not purified. Ordinary green soap contains an excess of alkali. It may be possible that, in washing out the vagina with this soap, it is the excess of alkali in the soap that does the work.

Dr. J. L. Rothrock (St. Paul): The rôle of the Trichomonas vaginalis in the pathology of vaginitis is still undecided. Until comparatively recently it was considered a harmless organism which was frequently found in the vagina of women.

It was not until 1916 that Höhne ascribed to it the rôle of an important etiological factor of vaginitis. He believed that it was not only the sole cause of many cases of vaginitis but that, instead of its being a harmless parasite, it frequently invaded the deeper structures and was responsible at times for vulvo-vaginal abscesses and other lesions beneath the superficial layers of the epithelium of the vagina; a position from which he was later obliged to recede.

In the years that followed, numerous papers appeared in German literature and opinion was pretty evenly divided. On account of the embargo on German publications occasioned by the war, these did not become accessible to American readers until about 1920. Since then this subject has been much discussed in American literature.

It is important that we keep in mind a few of its characteristic features. While it is possible to grow it on artificial media, no one has as yet been able to procure it in pure culture.

Inoculation of the vagina of healthy women with the organism grown on artificial media or even with vaginal secretion obtained from a case of vaginitis, fails to produce the disease.

It is frequently found in the vagina of women who show no sign of vaginitis.

It is limited in its distribution to the vaginal tract and vulva, involvement of the external genitals being probably made possible by irritation from the discharge.

It does not invade the uterine cavity.

There is no specific treatment but it yields promptly to various antiseptics.

Are we justified, therefore, in speaking of a trichomonas vaginitis?

The pronounced tendency to recurrence, which has been emphasized as a proof of its specific etiology may possibly be partly explained by a lowered resistance in certain individuals on the ground of constitutional disease with the disturbance of the balance of the endocrine glands just as we recognize that the invasion of the vagina by pathogenic bacteria is favored by such disturbance.

In point of its clinical importance it is interesting to call to mind the frequency of vaginitis in pregnant women with its possible bearing in the production of puerperal morbidity. The weight of opinion today is that it does not tend materially to increase it. Nevertheless it is important that vaginitis occurring in pregnant women should be promptly treated.

If this discussion has accomplished no other result it has focused attention on the importance of rational treatment as applied to vaginitis, which I fear has fallen into neglect in recent years.

Dr. Condit (in closing): I was very much interested in Dr. Rothrock's remarks relative to lowered resistance in the female being a predisposing factor in the occurrence of vaginitis. Minnesota Medicine of April, 1931, published a paper on non-specific vaginitis which I had presented before the annual meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons at Niagara Falls, Ontario, September, 1930, in which I laid great stress upon this point of lowered resistance. I can recall many patients suffering recurrences of vaginal discharges on the occurrence of severe or mild infections, physical tire, or worry. We do find this flagellate in many human mouths and vaginæ of patients in whom no symptoms of their presence or activity occur.

Note: Since the meeting of March 8, I have received correspondence from Robert Hegner, Ph.D., Professor of Protozoölogy, Johns Hopkins University, which I offer here as a supplement to this discussion:

March 29, 1933.

Dr. William H. Condit,
1009 Nicollet Avenue,
Minneapolis, Minn.
Dear Dr. Condit:

I do not believe it is yet certain that Trichomonas vaginalis causes inflamamtion or vaginitis. Pure cultures of Trichomonas vaginalis have been grown many times. A correspondent from one of the Southern States claims to have brought about vagi-

nitis in colored women by inoculating them with the flagellate, but he certainly included bacteria along with the trichomonads. I am not quite sure of your definition of a pure culture. Trichomonads do not appear to grow in culture medium in the absence of bacteria. As you state, the general impression is that T. vaginalis is pathogenic, and I am inclined to this opinion myself, but it certainly has not been definitely proven. I have recently obtained vaginal infections in monkeys with T. hominis from the intestine of man, but these infections seem to be temporary. I do not believe my previously published results prove anything more than that.

Very sincerely yours,
(Signed) Robert Hegner.

POSTOPERATIVE PERITONEAL ADHESIONS

Some Causes and Means of Prevention
A. E. Benjaamin, M.D., *Minneapolis*

Paper with discussions by Drs. A. A. Zierold and O. H. Wangensteen is to be published at a later date in Minnesota Medicine.

R. T. La Vake, M.D., *Secretary.*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Ten Years of Obstetrics and Gynecology in Private Practice. John L. Rothrock, A.B., M.D., F.A.C.S. Formerly Associate Professor of Obstetrics and Gynecology, University of Minnesota; former member Miller Clinic, and Chief of Obstetrical and Gynecological Services of Charles T. Miller Hospital and Wilder Dispensary, Saint Paul, Minnesota. 209 pages. Illus. Price, $3.50, cloth. New York: Paul B. Hoeber, Inc., 1933.

Chininum in der Allgemeinpraxis. Dr. Med. Fritz Johannesohn, of Mannheim. 175 pages. Amsterdam, Holland: Bureau for Increasing the Use of Quinine, 1933.

CHRONIC ARTHRITIS AND FIBROSITIS: DIAGNOSIS AND TREATMENT. Bernard Langdon Wyatt, M.D. 201 pages. Illus. Price, $3.50. Baltimore: William Wood & Co., 1933.

A better title for this monograph might have been "Recent Advances in Chronic Arthritis," as the book is more or less of a review of the recent work done in this field. The author quotes at length from the most recent research done in the field of chronic rheumatism. However, this book is of considerable interest to one concerned with this problem, as it gives a clear-cut, conservative point of view of the entire subject. This particular field is so confused and so controversial that it is especially difficult to give an unbiased review. The author has accomplished this in an excellent fashion and he has been able to write a brief and easily understood résumé.

The first four chapters consider the statistical aspect, especially the nomenclature, pathology and differential diagnosis. The author has accepted the classification provided by the American Committee for the Control of Rheumatism but he has unfortunately elected to use synonymously the term, chronic infectious arthritis with proliferative arthritis. Because of the controversy which is now going on as to the etiology of chronic arthritis it would seem better to use the term, chronic infectious arthritis only for those cases in which the specific infection is known. The use of the term, infectious arthritis indicates that other types of arthritis are noninfectious. Some of the most recent work would tend to indicate that all types of arthritis may be of bacteriological origin. It appears that all types of arthritis can be grouped under the two headings, proliferative and degenerative arthritis.

The fourth and fifth chapters consider therapeutic measures. The author discusses not only the general treatment necessary, such as the removal of the foci of infection and methods of increasing the resistance of the patient, but also gives detailed information in the use of physio-therapeutic measures. The value of massage, heat and occupational therapy is stressed and the point is correctly brought out that physiotherapy is sadly neglected in this country.

The author has accepted as an additional method of treatment, the use of intravenous vaccine and states that he has obtained a good percentage of improvement with the use of intravenous streptococcus vaccine. One would like to know on what grounds this conclusion was made when it is considered that various methods of treatment were used at the same time. It seems a difficult task to determine exactly how much value was actually obtained by the use of vaccine injections without the use of control experiments.

This book can be well recommended to any one interested in this subject as it gives a well written and comprehensive study of the recent work on arthritis.

M. J. Shapiro, M.D.

THE TECHNIC OF CONTRACEPTION. Eric M. Matsner, M. D. Published for the American Birth Control League by the Williams & Wilkins Company of Baltimore, 1933.

The pamphlet contains illustrated directions for using various mechanical devices for the prevention of conception. It has to admit that ideal prevention has not yet been discovered, and that it has been impossible to find an infallible method to circumvent nature's aim to reproduce species.

William Davis, M.D.

THE PRACTICAL MEDICINE SERIES, GENERAL MEDICINE. By a corps of editors: Series 1932. Chicago: The Year Book Publishers, Inc., 1932.

It is a surprise to find arthritis included in the section of infectious diseases with which this volume begins. Infectious diseases and contagious diseases have never been separated from one another satisfactorily nor their limits defined; still it is unexpected to find arthritis grouped with diphtheria, measles, smallpox and other diseases communicable by direct or indirect contact and arising only from cases of the same kind. In this section considerable space is given to the comparatively new diseases, psittacosis, tularemia, and undulant fever, all of which are on the increase in this country and now are found distributed quite generally.

Under smallpox is given an abstract of a paper by Woodward in the *New England Journal of Medicine* for March 17, 1932, containing new figures upon vaccination. Four states have laws against compulsory vaccination. These "free" states, so-called by the anti-vaccinationists, are Arizona, Utah, North Dakota, and Minnesota, and in 1920 their combined population was 35,000 less than that of Massachusetts. In the ten years 1919-1928 these "free" states had a total of 46,130 cases of smallpox, while in Massachusetts there were but 408. What a glorious company Minnesota is in!

To protect themselves against closure for quarantine because of smallpox, twelve of the leading preparatory schools and thirty-six of the foremost universities and colleges, both for men and for women, now admit no unvaccinated pupils.

The section on diseases of the chest, excepting the heart, is by Lawrason Brown, of Trudeau Sanatorium, and naturally tuberculosis has the first place. Much is said of x-ray diagnosis, B C G vaccination, trauma, and the surgery of the thorax. Minnesota figures largely in this section, with papers from Pokegama on the use of insulin to improve the appetite, on the results in control by Meyerding, on the detection of the disease in a farming community, by Simmons, and again by Anderson, on the prevalence of tuberculosis among students at the University by Wulff and Myers, its control by Diehl, its prevalence among nurses by Geer, and its management by surgery by Wangensteen.

In the section on diseases of the blood and blood-forming organs, edited by Minot and Castle, of Boston, it is not surprising that pernicious anemia holds the most prominent place. Stress is laid upon the necessity of keeping up the liver treatment and of attention to the general diet, giving digestible foods with an abundance of fruit and green vegetables. To fix an amount of liver that will apply to all cases would be as futile as to try to establish a dose of insulin that would suit every diabetic.

William D. Stronk, of the University of Pennsylvania, has the section on diseases of the heart and blood vessels. Here again is an extensive quotation from an important paper by a Minnesota doctor, a review of subacute bacterial endocarditis by S. Marx White, of Minneapolis. This disease is so closely associated with Osler, who wrote a classical description of it, that it might fairly be called Osler's disease, a name that is indeed not infrequently applied to it. It is encouraging to learn that White finds it much less hopeless than was thought formerly, although he has no specific to offer for it.

Under the heading "Diseases of the Digestive System and Metabolism," managed by Ralph C. Brown, of Rush, there is an abstract of a good paper on duodenal ulcer by John A. Ryle, published in the *London Lancet* last year, and urging that surgeons and physicians keep in mind ulcer the disease and not merely the local lesion. In other words the patient should be treated in mind and body and correction should be made of bad habits such as irregular and bolted meals, excessive smoking, and the intrusion of business and other worries upon the digestion. There are interesting observations by several other writers upon various aspects of the problems both of duodenal and of gastric ulcers.

William Davis, M.D.

HEALTH ON THE FARM AND IN THE VILLAGE. D. E. A. Winslow, Dr.P.H. 281 pages. Illus. Price $1.00. New York: The Macmillan Co., 1931.

This volume is an evaluation of work done in a health demonstration in a county of 72,000 (Cattaraugus County, New York). The work was initiated by Milbank Fund, which supplied a large part of the money at the beginning of the demonstration. At the end of seven years (1929) Dr. Winslow and a corps of workers were called in to evaluate in an impartial way the work accomplished.

The dictum of Dr. Biggs "Public Health is Purchasable" was again exemplified by this demonstration. There was a marked reduction in diphtheria, tuberculosis and infant mortality, all of which were reduced below the normal reductions.

Another big achievement was the convincing of the county authorities of the value of the demonstration and thus winning their financial support. The cost in 1929 was $3.39 per capita. The book is primarily of interest to Public Health Workers.

F. L. Jennings, M.D.

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Annual meeting, October

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Secretary
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Barr, W. H. ..... Wells
Blanchard, H. G. ..... Fairmont
Boysen, Herbert ..... Welcome
Butz, J. A. ..... Monterey
Demo, P. W. ..... Wells
Durgin, F. L. ..... Winnebago
Folta, John ..... Ceylon
Gardner, V. H. ..... Fairmont
Heimark, J. J. ..... Fairmont
Henderson, A. J. ..... Kiester
Holm, P. F. ..... Wells
Hunt, F. N. ..... Fairmont
Hunt, R. C. ..... Fairmont
Jacobs, A. C. ..... Elmore
Johnson, H. P. ..... Fairmont
Luedtke, G. H. ..... Fairmont
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Miller, H. A. ..... Fairmont
Mills, J. L. ..... Winnebago
Richardson, W. J. ..... Fairmont
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Annual meeting, Fourth Thursday of October

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Bacon, R. S. ..... Montevideo
Bergh, L. N. ..... Montevideo
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Cress, E. E. ..... Boyd
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Duclos, J. A. ..... Henderson
Flinn, T. E. ..... Redwood Falls
Foshager, H. T. ..... Clara City
Gaines, E. C. ..... Buffalo Lake
Hauge, M. I. ..... Clarkfield
Hauge, M. M. ..... Clarkfield
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Johnson, H. M. ..... Dawson
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Loenholdt, E. H. ..... Hector
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Westby, Magnus ..... Madison

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Regular meetings, Spring and Fall
Annual meeting, December

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Secretary
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Aborn, W. H. ..... Hawley
Archibald, F. M. ..... Mahnomen
Bergheim, M. C. ..... Hawley
Bottolfson, B. T. ..... Moorhead
Flancher, L. H. ..... Lake Park
Hagen, O. J. ..... Moorhead
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Heimark, J. H. ..... Moorhead
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Larsen, O. O. ..... Detroit Lakes
Larson, O. L. ..... Detroit Lakes
Rutledge, L. H. ..... Detroit Lakes
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Soine, T. S. ..... Barnesville
Thornby, H. J. ..... Moorhead
Thysell, F. A. ..... Moorhead

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Annual meeting, December

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Secretary
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Blumenthal, J. S. ..... Columbia Heights
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Vik, Melvin ..... Onamia
Vrooman, F. E. ..... St. Francis
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Regular meetings, quarterly
Annual meeting, December

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Secretary
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Branham, D. S.....Albert Lea
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Calhoun, F. W.....Albert Lea
Folken, F. G.....Albert Lea
Freeman, J. P.....Albert Lea
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Gamble, J. W.....Albert Lea
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Gullixson, A.....Albert Lea
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Schultz, J. A.....Albert Lea
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GOODHUE COUNTY MEDICAL SOCIETY

Annual meeting, usually December

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Secretary
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Aanes, A. M.....Red Wing
Anderson, S. H.....Red Wing

Brusegard, J. F.....Red Wing
Claydon, D. R.....Red Wing
Claydon, H. F.....Zumbrota
Claydon, L. E.....Red Wing
Cremer, M. H.....Red Wing
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Juers, E. H.....Red Wing
Liffrig, W. W.....Goodhue
McGuigan, H. T.....Red Wing
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Smith, M. W.....Red Wing
Steffens, L. A.....Red Wing
Vaaler, T.....Cannon Falls
Williams, M. R.....Cannon Falls

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Regular meetings, first Monday of each month
Annual meeting, October

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Secretary
Campbell, O. J.....Minneapolis

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Allison, R. G.....Minneapolis
Almquist, H. E.....Minneapolis
Altnow, H. O.....Minneapolis
Andersen, A. G.....Minneapolis
Andersen, S. C.....Minneapolis
Anderson, D. D.....Minneapolis
Anderson, E. D.....Minneapolis
Anderson, E. R.....Minneapolis
Anderson, F. J.....Minneapolis
Anderson, J. K.....Minneapolis
Anderson, K. W.....Minneapolis
Anderson, P. A.....Minneapolis
Anderson, U. S.....Minneapolis
Andreassen, E. C.....Minneapolis
Annis, H. B.....Minneapolis
Arey, H. C.....Excelsior
Arvidson, C. G.....Minneapolis
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Avery, J. F.....Minneapolis
Baken, M. P.....Minneapolis
Baker, A. T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, Looe.....Minneapolis
Barber, J. P.....Minneapolis
Barron, Moses.....Minneapolis
Bass, G. W.....Minneapolis
Baxter, S. H.....Minneapolis
Beard, A. H.....Minneapolis
Beard, R. O.....Minneapolis
Bedford, E. W.....Minneapolis
Bell, E. T.....Minneapolis
Bell, J. W.....Minneapolis
Benedict, E. E.....Minneapolis
Benjamin, A. E.....Minneapolis
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Drake, C. R.....Minneapolis
Dreisbach, Norman.....Minneapolis
Drill, H. E.....Hopkins
Duff, E. R.....Minneapolis
Dunlap, E. H.....Minneapolis
Dunn, G. R.....Minneapolis
Duryea, Marbry.....Minneapolis
Dutton, C. E.....Minneapolis
Dwan, P. F.....Minneapolis
Dworsky, S. D.....Minneapolis
Ehrenberg, C. J.....Minneapolis
Ehrlich, S. P.....Minneapolis
Eich, Matthew.....Minneapolis
Eisenstadt, D. H.....Minneapolis
Eitel, G. D.....Minneapolis
Ellison, D. E.....Minneapolis
Emond, A. J.....Minneapolis
Erb, F. A.....Minneapolis
Erdman, C. A.....Minneapolis
Erickson, R. F.....Minneapolis
Ericson, J. G.....Minneapolis
Ericson, R. M.....Minneapolis
Evans, E. T.....Minneapolis
Evans, R. D.....Minneapolis
Exley, E. W. F.....Minneapolis
Fahr, G. E.....Minneapolis
Fansler, W. A.....Minneapolis
Feeney, J. M.....Minneapolis
Fenger, E. P. K.....Oak Terrace
Fetterly, Warren.....Minneapolis
Fink, L. W.....Minneapolis
Fink, W. H.....Minneapolis
Fitzgerald, D. F.....Minneapolis
Fjeldstad, C. A.....Minneapolis
Fowler, L. H.....Minneapolis
Fredericks, G. M.....Minneapolis
Friedell, Aaron.....Minneapolis
Funk, V. K.....Oak Terrace
Ford, W. H.....Minneapolis
Gammell, J. H.....Minneapolis
Gardner, E. L.....Minneapolis
Geist, E. S.....Minneapolis
Giere, E. O.....Minneapolis
Giere, J. C.....Minneapolis
Giere, R. W.....Minneapolis
Giessler, P. W.....Minneapolis
Gilles, F. L.....Minneapolis
Ginsberg, Harry.....Minneapolis
Gratzek, F. R.....Minneapolis
Grave, Floyd.....Minneapolis
Green, E. K.....Minneapolis
Greene, W. P.....Minneapolis
Grimes, Marian.....Minneapolis
Gunderson, N. A.....Minneapolis
Gustafson, H. T.....Minneapolis
Hacking, F. H.....Minneapolis
Haddow, N. W.....Minneapolis
Hagen, G. L.....Minneapolis
Haggard, G. D.....Minneapolis
Hall, J. M.....Minneapolis
Hallberg, C. A.....Minneapolis
Hamel, A. L.....Minneapolis
Hamilton, A. S.....Minneapolis
Hamlin, G. B.....Minneapolis
Hammond, A. J.....Minneapolis
Hannah, H. B.....Minneapolis
Hansen, C. O.....Minneapolis
Hansen, E. W.....Minneapolis
Hansen, Olga S.....Minneapolis
Hanson, H. J.....Minneapolis
Hanson, H. V.....Minneapolis
Hanson, W. A.....Minneapolis
Hare, E. R.....Minneapolis
Harrington, C. D.....Minneapolis
Harrington, F. E.....Minneapolis
Hartzell, T. B.....Minneapolis
Hastings, D. R.....Minneaoolis
Haverfield, Addie R.....Minneapolis
Hawkinson, R. P.....Robbinsdale
Hayes, J. M.....Minneapolis
Head, D. P.....Minneapolis

*Deceased.

Head, G. D. ..... Minneapolis
Hearn, W. O. ..... Minneapolis
Hedback, A. E. ..... Minneapolis
Heim, R. R. ..... Minneapolis
Helk, H. H. ..... Minneapolis
Hendrickson, J. F. ..... Minneapolis
Henry, C. E. ..... Minneapolis
Henry, M. O. ..... Minneapolis
Herman, A. L. ..... Minneapolis
Hesdorffer, M. B. ..... Minneapolis
Hiebert, J. P. ..... Minneapolis
Higgins, J. H. ..... Minneapolis
Hill, Eleanor J. ..... Minneapolis
Hirschfelder, A. D. ..... Minneapolis
Hirshfield, F. R. ..... Minneapolis
Hoagland, A. W. ..... Minneapolis
Hobbs, C. A. ..... Minneapolis
Hodge, S. V. ..... Minneapolis
Hoiland, A. S. ..... Minneapolis
Holl, P. M. ..... Minneapolis
Holt, W. B. ..... Minneapolis
Howard, W. H. ..... Minneapolis
Huenekens, E. J. ..... Minneapolis
Hughes, L. D. ..... Minneapolis
Huitkrans, R. E. ..... Minneapolis
Hurd, Annah ..... Minneapolis
Husband, M. W. ..... Minneapolis
Hynes, J. E. ..... Minneapolis
Irwin, A. F. ..... Minneapolis
Jackson, C. M. ..... Minneapolis
Jennings, F. L. ..... Oak Terrace
Jennings, Mary H. ..... Minneapolis
Jensen, Harry ..... Minneapolis
Jensen, M. J. ..... Minneapolis
Johnson, A. B. ..... Minneapolis
Johnson, A. E. ..... Minneapolis
Johnson, J. A. ..... Minneapolis
Johnson, Julius ..... Minneapolis
Johnson, N. A. ..... Minneapolis
Johnson, Norman ..... Minneapolis
Johnson, R. A. ..... Minneapolis
Johnson, S. M. ..... Minneapolis
Johnson, Y. T. ..... Minneapolis
Jones, G. M. ..... Minneapolis
Jones, H. W. ..... Minneapolis
Jones, W. R. ..... Minneapolis
Josewich, Alexander ..... Minneapolis
Kelby, G. M. ..... Minneapolis
Kennedy, C. C. ..... Minneapolis
Kennedy, Jane F. ..... Minneapolis
Kennedy, R. R. ..... Minneapolis
Kertesz, G. ..... Minneapolis
Kibbe, O. A. ..... Minneapolis
King, E. A. ..... Minneapolis
King, H. T. ..... Minneapolis
King, W. R. ..... Minneapolis
Kinsella, T. J. ..... Oak Terrace
Kistler, A. J. ..... Minneapolis
Kistler, C. M. ..... Minneapolis
Knight, R. R. ..... Minneapolis
Knight, R. T. ..... Minneapolis
Koch, J. C. ..... Minneapolis
Koepcke, G. M. ..... Minneapolis
Koller, H. M. ..... Minneapolis
Koller, L. R. ..... Minneapolis
Kucera, F. J. ..... Hopkins
Kucera, W. J. ..... Minneapolis
Lagersen, R. W. ..... Minneapolis
Lajoie, J. M. ..... Minneapolis
Lapierre, A. P. ..... Minneapolis
Lapierre, C. A. ..... Minneapolis
Lapierre, J. T. ..... Minneapolis
Larson, C. M. ..... Minneapolis
Larson, L. M. ..... Minneapolis
Laurent, A. A. ..... Minneapolis
La Vake, R. T. ..... Minneapolis
Lazar, H. L. ..... Minneapolis
Lebowske, J. A. ..... Minneapolis
Lee, H. M. ..... Minneapolis
Leland, H. R. ..... Minneapolis
Leland, M. N. ..... Minneapolis
Leonard, L. J. ..... Minneapolis
Lillehei, E. J. ..... Robbinsdale
Lind, C. J. ..... Minneapolis
Lindquist, R. H. ..... Minneapolis
Linner, H. P. ..... Minneapolis
Linton, W. B. ..... Minneapolis
Litman, A. B. ..... Minneapolis
Litzenberg, J. C. ..... Minneapolis
Logefeil, R. C. ..... Minneapolis
Long, Jesse ..... Minneapolis
Loomis, E. A. ..... Minneapolis
Lundgren, A. C. ..... Minneapolis
Lundquist, E. F. ..... Minneapolis
Lynch, M. J. ..... Minneapolis
Lyon, E. P. ..... Minneapolis
Lysne, Henry ..... Minneapolis
MacDonald, A. E. ..... Minneapolis
MacDonald, D. A. ..... Minneapolis
MacDonald, I. C. ..... Minneapolis
Mach, F. B. ..... Minneapolis
Macnie, J. S. ..... Minneapolis
Maland, C. O. ..... Minneapolis
Mann, A. T. ..... Minneapolis
Mariette, E. S. ..... Oak Terrace
Mark, D. B. ..... Minneapolis
Matchan, G. R. ..... Minneapolis
Matthews, Justus ..... Minneapolis
Mattill, P. M. ..... Oak Terrace
Mattson, Hamlin ..... Minneapolis
Maxeiner, S. R. ..... Minneapolis
May, W. H. ..... Minneapolis
McCarthy, Donald ..... Minneapolis
McDaniel, Orianna ..... Minneapolis
McEachran, A. ..... Minneapolis
McFarland, A. H. ..... Minneapolis
McGandy, R. F. ..... Minneapolis
McGeary, G. E. ..... Minneapolis
McInerney, Maurice ..... Minneapolis
McIntyre, George ..... Minneapolis
McKinlay, C. A. ..... Minneapolis
McKinley, J. C. ..... Minneapolis
McKinney, F. S. ..... Minneapolis
McPheeters, H. O. ..... Minneapolis
Meland, E. L. ..... Minneapolis
Merkert, C. E. ..... Minneapolis
Merkert, G. L. ..... Minneapolis
Meyer, E. L. ..... Minneapolis
Michael, J. C. ..... Minneapolis
Michelson, H. E. ..... Minneapolis
Milton, J. S. ..... Minneapolis
Moen, J. K., Jr. ..... Minneapolis
Moir, W. W. ..... Minneapolis
Moorhead, M. B. ..... Minneapolis
Moriarty, Cecile R. ..... Minneapolis
Morrison, A. W. ..... Minneapolis
Morse, R. W. ..... Minneapolis
Morton, H. McI. ..... Minneapolis
Murphy, I. J. ..... Minneapolis
Murphy, Leo ..... Minneapolis
Myers, J. A. ..... Minneapolis
Nathanson, M. H. ..... Minneapolis
Nielson, H. F. ..... Minneapolis
Nelson, C. P. ..... Owatonna
Nelson, Harvey ..... Minneapolis
Nelson, H. S. ..... Minneapolis
Nelson, O. E. ..... Minneapolis
Newhart, Horace ..... Minneapolis
Nordin, G. T. ..... Minneapolis
Nordland, Martin ..... Minneapolis
Noth, H. W. ..... Minneapolis
Nystrom, Ruth ..... Minneapolis
Oberg, C. M. ..... Minneapolis
O'Brien, W. A. ..... Minneapolis
O'Donnell, J. E. ..... Minneapolis
Olson, F. A. ..... Minneapolis
Olson, O. A. ..... Minneapolis
Olson, R. G. ..... Minneapolis
Oppen, E. G. ..... Minneapolis
Owre, Oscar ..... Minneapolis
Parks, A. H. ..... Minneapolis
Patterson, W. E. ..... Minneapolis
Paulsen, E. L. ..... Minneapolis
Pearce, N. O. ..... Minneapolis
Pederson, Harold ..... Minneapolis
Pederson, R. M. ..... Minneapolis
Peppard, T. A. ..... Minneapolis
Perry, R. St. J. ..... Minneapolis
Petersen, J. R. ..... Minneapolis
Petersen, Thorvald ..... Minneapolis
Peterson, H. W. ..... Minneapolis
Peterson, O. H. ..... Minneapolis
Peterson, W. C. ..... Minneapolis
Petit, L. J. ..... Minneapolis
Pettit, C. W. ..... Minneapolis
Pfunder, M. C. ..... Minneapolis
Phelps, K. A. ..... Minneapolis
Platou, E. S. ..... Minneapolis
Pollard, D. W. ..... Minneapolis
Poliock, D. K. ..... Minneapolis
Poppe, F. H. ..... Minneapolis
Pratt, F. J. ..... Minneapolis
Pratt, J. A. ..... Minneapolis
Preine, I. A. ..... Minneapolis
Prim, J. A. ..... Minneapolis
Proshek, C. E. ..... Minneapolis
Polzak, J. A. ..... Minneapolis
Quinby, T. F. ..... Minneapolis
Quist, H. W. ..... Minneapolis
Regnier, E. A. ..... Minneapolis
Reynolds, J. S. ..... Minneapolis
Rice, C. O. ..... Minneapolis
Richdorf, L. F. ..... Minneapolis
Ridgway, Florence ..... Minneapolis
Rigler, L. G. ..... Minneapolis
Rishmiller, J. H. ..... Minneapolis
Rizer, R. I. ..... Minneapolis
Roan, C. M. ..... Minneapolis
Robb, E. F. ..... Minneapolis
Roberts, T. S. ..... Minneapolis
Roberts, W. B. ..... Minneapolis
Robitshek, E. C. ..... Minneapolis
Rochford, W. E. ..... Minneapolis
Rodda, F. C. ..... Minneapolis
Rodgers, C. L. ..... Minneapolis
Rosen, Samuel ..... Minneapolis
Rosenwald, R. M. ..... Minneapolis
Rucker, C. W. ..... Minneapolis
Rucker, W. H. ..... Minneapolis
Rud, N. E. ..... Minneapolis
Rudell, G. L. ..... Minneapolis
Russeth, A. N. ..... Minneapolis
Saliterman, B. I. ..... Minneapolis
Salt, C. G. ..... Minneapolis
Sawatzky, W. A. ..... Minneapolis
Schaaf, F. H. K. ..... Minneapolis
Schaefer, W. G. ..... Minneapolis
Scheldrup, N. H. ..... Minneapolis
Schmitt, A. F. ..... Minneapolis
Schmitt, S. C. ..... Minneapolis
Schneider, J. P. ..... Minneapolis
Schussler, O. F. ..... Minneapolis
Schwartz, V. J. ..... Minneapolis
Schwyzer, Gustav ..... Minneapolis
Schwyzer, Robert ..... Minneapolis
Scott, F. H. ..... Minneapolis
Seashore, Gilbert ..... Minneapolis
Seham, Max ..... Minneapolis
Sellescth, I. F. ..... Minneapolis
Shapiro, M. J. ..... Minneapolis
Simons, Jalmar ..... Minneapolis
Simpson, E. D. ..... Minneapolis
Siperstein, D. M. ..... Minneapolis
Sitar, R. F. ..... Minneapolis
Sivertsen, Ivar ..... Minneapolis
Slocumb, Maude S. ..... Minneapolis
Smith, A. E. ..... Minneapolis
Smith, A. M. ..... Minneapolis
Smith, H. R. ..... Minneapolis
Smith, N. M. ..... Minneapolis
Smith, Wyman ..... Minneapolis
Soderlind, R. T. ..... Minneapolis
Solhaug, S. B. ..... Minneapolis
Spano, J. P. ..... Minneapolis
Spratt, C. N. ..... Minneapolis
Stelter, L. A. ..... Minneapolis
Stewart, C. A. ..... Minneapolis
Stewart, R. I. ..... Minneapolis
Stomel, Joseph ..... Minneapolis
Strachauer, A. C. ..... Minneapolis
Strout, E. S. ..... Minneapolis
Sturre, J. R. ..... Minneapolis
Sundt, Mathias ..... Minneapolis
Swanson, Cephas ..... Minneapolis
Swanson, R. E. ..... Minneapolis
Sweetser, H. B., Sr. ..... Minneapolis
Sweetser, H. B., Jr. ..... Minneapolis
Sweetser, T. H. ..... Minneapolis
Sweitzer, S. E. ..... Minneapolis
Swendseen, C. G. ..... Minneapolis
Taft, J. O. ..... Minneapolis
Tanner, A. C. ..... Minneapolis
Ternstrom, O. H. ..... Minneapolis
Thomas, G. E. ..... Minneapolis
Thomas, G. H. ..... Minneapolis
Thomas, G. J. ..... Minneapolis
Tingdale, A. C. ..... Minneapolis
Trueman, H. S. ..... Minneapolis
Tunstead, H. J. ..... Minneapolis
Turnacliff, D. D. ..... Minneapolis
Tyrrell, C. C. ..... Minneapolis
Ude, W. H. ..... Minneapolis
Ulrich, H. L. ..... Minneapolis
Urner, J. A. ..... Minneapolis
Vik, A. E. ..... Minneapolis
Voyer, E. O. ..... Minneapolis
Wahlquist, H. F. ..... Minneapolis
Waldron, C. W. ..... Minneapolis
Wall, C. R. ..... Minneapolis
Wangensteen, O. H. ..... Minneapolis
Ward, A. W. ..... Minneapolis
Ward, P. A. ..... Minneapolis
Warham, T. T. ..... Minneapolis
Watson, J. A. ..... Minneapolis
Webb, R. C. ..... Minneapolis
Weisman, S. A. ..... Minneapolis
Welles, H. J. ..... Minneapolis
Westman, R. T. ..... Minneopolis
Wethall, A. G. ..... Minneapolis
Wetherby, Macnider ..... Minneapolis
Weum, T. W. ..... Minneapolis
White, S. M. ..... Minneapolis
White, W. D. ..... Minneapolis
Widen, W. F. ..... Minneapolis
Wiese, H. F. B. ..... Minneapolis
Wilcox, A. E. ..... Minneapolis
Wilder, R. L. ..... Minneapolis
Wilken, P. A. ..... Minneapolis
Wilkerson, V. A. ..... Minneapolis
Willcutt, C. E. ..... Minneapolis
Williams, H. L., Jr. ..... Minneapolis
Williams, Robert ..... Minneapolis
Winther, Nora M. C. ..... Minneapolis

Witham, C. A.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wood, D. F.....Minneapolis
Woodworth, Elizabeth .....Minneapolis
Wright, C. B.....Minneapolis
Wright, C. D.....Minneapolis
Wright, F. R.....Minneapolis
Wyatt, O. S.....Minneapolis
Wynne, H. M. N.....Minneapolis
Ylvisaker, R. S.....Minneapolis
Yoerg, O. W.....Minneapolis
Zaworski, E. A.....Minneapolis
Zierold, A. A.....Minneapolis
Ziskin, Thomas .....Minneapolis

KANDIYOHI-SWIFT COUNTY MEDICAL SOCIETY

Regular meetings, monthly at call
Annual meeting, December

President
Jensen, Herman H.....Atwater

Secretary
Scofield, C. L.....Benson

Anderson, R. E.....Willmar
Arnson, J. M.....Benson
Behmler, F. W.....Appleton
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Daignault, Oscar .....Benson
Dowswell, W. J.....Kerkhoven
Fiksdal, M. J.....Willmar
Fredrickson, Alice C.....Lake Lillian
Fredrickson, G. U. Y.....Lake Lillian
Frisch, F. P.....Willmar
Frost, E. H.....Willmar
Giere, S. W.....Benson
Hodapp, R. J.....Willmar
Hutchinson, Henry.....New London
Jacobs, J. C.....Willmar
Jensen, H. H.....Atwater
Johnson, Hans .....Kerkhoven
Kaufman, W. C.....Appleton
Scofield, C. L.....Benson
Smith, B. F.....Willmar
Thompson, Arthur.....Raymond

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, first Tuesday of month
Annual meeting, October

President
Olson, Archibald.....Hendricks

Secretary
Workman, H. M.....Tracy

Akester, Ward .....Marshall
Bossingham, O. N.....Lake Benton
Ford, B. C.....Marshall
Germo, Charles .....Balaton
Golden, C. M.....Tyler
Gray, F. D.....Marshall
Happe, L. J.....Marshall
Hermanson, P. E.....Hendricks
Hoidale, A. D.....Tracy
Jacquot, G. L.....Marshall
Olson, Archibald .....Hendricks
Persons, C. E.....Marshall
Purvis, G. H.....Russell
Robertson, J. B.....Cottonwood
Sanderson, E. T.....Minneota
Thordarson, Theo .....Minneota
Vadheim, A. L.....Tyler
Valentine, W. H.....Tracy
Workman, H. M.....Tracy
Workman, W. G.....Tracy
Yaeger, W. W.....Ivanhoe

McLEOD COUNTY MEDICAL SOCIETY

Annual meeting, January

President
Scholpp, O. W.....Hutchinson

Secretary
Klima, W. W.....Stewart

Clement, J. B.....Lester Prairie
Crow, E. R.....Arlington
Holm, H. H.....Glencoe
Jensen, A. H.....Hutchinson
Klima, W. W.....Stewart
Langhoff, A. H.....Glencoe
Lipomann, E. W.....Hutchinson
McMahon, M. J.....Green Isle
Ninneman, N. N.....Silver Lake
Sahr, W. G.....Hutchinson
Scholpp, O. W.....Hutchinson
Sheppard, Fred .....Hutchinson
Sheppard, P. E.....Hutchinson
Trutna, T. J.....Silver Lake

MEEKER COUNTY MEDICAL SOCIETY

Annual meeting, December

President
Dulude, S. S.....Dassel

Secretary
Danielson, K. A.....Litchfield

Brigham, Frank .....Watkins
Danielson, K. A.....Litchfield
Danielson, Lennox .....Litchfield
Dulude, S. S.....Dassel
Edwards, G. C.....Grover City
Macklin, W. E., Jr.....Litchfield
O'Connor, D. C.....Eden Valley
Telford, V. J.....Litchfield
Wilmot, H. E.....Litchfield

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of month except June, July and August
Annual meeting, last Thursday of November

President
Havens, J. G. W.....Austin

Secretary
Robertson, P. A.....Austin

Allen, A. W.....Austin
Allen, C. C.....Austin
Coleman, F. B.....Austin
Cronwell, B. J.....Austin
Flanagan, L. G.....Austin
Greene, H. H.....Austin
Grise, W. B.....Austin
Havens, J. G. W.....Austin
Hegge, O. H.....Austin
Hegge, R. S.....Austin
Henslin, A. E.....Le Roy
Hertel, G. E.....Austin
Leck, P. C.....Austin
Lommen, P. A.....Austin
McKenna, J. K.....Austin
Melzer, G. R.....Lyle
Mitchell, R. S.....Grand Meadow
Morse, M. P.....Le Roy
Rebman, E. C.....Austin
Robertson, P. A.....Austin
Sherman, H. T.....Grand Meadow

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Annual meeting, December

President
Lenander, M. E.....St. Peter

Secretary
Petersen, M. C.....St. Peter

Aitkins, H. B.....Le Center
Covell, W. W.....St. Peter
Daniels, J. W.....St. Peter
Ericson, Swan .....Le Sueur
Freeman, G. H.....St. Peter
Gully, R. J.....St. Peter
Holtan, Theodore .....Waterville
Kerschbaumer, Louisa.....St. Peter
Lenander, M. E.....St. Peter
McKeon, J. O.....Montgomery
Petersen, M. C.....St. Peter
Strathern, F. P.....St. Peter
Watz, C. E.....Le Sueur
Wolner, O. H.....St. Peter

OLMSTED-HOUSTON-FILLMORE COUNTY MEDICAL SOCIETY

Regular meetings, first Tuesday each odd month
Annual meeting, November

President
Eusterman, G. B.....Rochester

Secretary
Piper, M. C.....Rochester

Adams, R. T.....Mantorville
Adson, A. W.....Rochester
Affeldt, D. E.....Kasson
Albers, E. C.....Rochester
Alderson, L. R.....Rochester
Allen, E. V.....Rochester
Allen, R. B.....Rochester
Allen, W. A.....Rochester
Alvarez, W. C.....Rochester
Amberg, Samuel .....Rochester
Anderson, C. M.....Rochester
Anderson, C. R.....Rochester
Anderson, M. J.....Rochester
Anderson, N. E.....Harmony
Atkinson, Walter .....Rochester
Baker, H. R.....Hayfield
Balfour, D. C.....Rochester
Bannick, E. G.....Rochester
Barber, K. W.....Rochester
Bargen, J. A.....Rochester
Barker, N. W.....Rochester
Barnes, A. R.....Rochester
Beiswanger, R. H.....Wykoff
Belote, G. B.....Caledonia
Benedict, W. L.....Rochester
Bennett, R. J., Jr.....Rochester
Berger, E. H.....Rochester
Berkman, D. M. .....Rochester
Berkman, J. M.....Rochester
Bigelow, C. E. .....Dodge Center
Binger, M. W.....Rochester
Bootnby, W. M.....Rochester
Boudry, M. O.....Rochester
Bowing, H. H.....Rochester
Braasch, W. F.....Rochester
Brav, E. A.....Rochester
Broders, A. C.....Rochester
Brown, A. E.....Rochester
Brown, G. E.....Rochester
Brown, P. W.....Rochester
Brown, R. W.....Cambridge
Bruenner, Bertram .....Rochester
Brunsting, L. A.....Rochester
Buie, L. A.....Rochester
Bumpus, H. C.....Rochester
Butsch, W. L.....Rochester
Cabot, C. M.....Rochester
Cabot, Hugh .....Rochester
Cain, E. F.....Rochester
Caldwell, J. M., Jr.....Rochester
Camp, J. D.....Rochester
Canfield, W. W.....Houston
Castleton, K. B.....Rochester
Church, G. T.....Rochester
Cilley, E. I. L.....Rochester
Clark, A. L.....Rochester
Collins, D. C.....Rochester
Comfort, M. W.....Rochester
Conner, H. M.....Rochester
Cook, E. N.....Rochester
Cook, N. C.....Rochester
Costello, R. T.....Rochester
Counseller, V. S.....Rochester
Craig, W. McK.....Rochester
Crenshaw, J. L.....Minneapolis
Crewe, J. E.....Rochester
Curry, F. S.....Rochester
Darnall, C. M.....Rochester
Davis, A. C.....Rochester
Davis, I. G.....Rushford
Desjardins, A. U.....Rochester
Deuterman, J. L.....Rochester
Dixon, C. F.....Rochester
Dolder, F. C.....Eyota
Drake, F. A.....Laneshoro
Drenckhahn, C. H.....Rochester
Drips, D. G.....Rochester
Dunlap, H. F.....Passaic, N. J.
Dunlop, J. G., Jr.....Rochester
Eby, C. B.....Spring Valley
Edward, George .....Canton
Emmett, J. L.....Rochester
Eusterman, G. B.....Rochester
Evans, V. L.....Rochester
Evarts, A. B.....Rochester
Fawcett, C. E.....Stewartville
Figi, F. A.....Rochester
Foor, C. G.....Rochester
Foster, R. F.....Rochester
Fricke, R. E.....Rochester
Fulcher, O. H.....Rochester
Gaarde, F. W.....Rochester
Garvin, R. O.....Rochester
Ghormley, R. K.....Rochester
Gibson, G. G.....Rochester
Giffin, H. Z.....Rochester
Gillespie, J. B.....Rochester
Gilpin, S. F., Jr.....Rochester
Goodwin, T. W.....Rochester
Gray, H. K.....Rochester
Grimes, A. E., Jr.....Rochester
Grinnell, W. B.....Preston
Habein, H. C.....Rochester
Haines, S. F.....Rochester
Hale, D. E.....Rochester
Hallenbeck, D. F.....Rochester
Hardgrove, M. A. F.....Rochester
Hargrave, R. L.....Rochester
Harper, F. R.....Rochester
Harrington, S. W.....Rochester
Hartman, H. R.....Rochester
Havens, F. Z.....Rochester
Hebert, W. H. J.....Rochester
Heck, F. J.....Rochester
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hench, P. S.....Rochester
Henderson, M. S.....Rochester
Hewitt, Edith S.....Rochester
Heyerdale, O. C.....Rochester
Hines, E. A., Jr.....Rochester
Hoerner, M. T.....Rochester
Horton, B. T.....Rochester
Howell, L. P.....Rochester
Howell, W. L.....Rochester
Hyde, T. L.....Rochester
Iber, F. C.....Rochester
Imes, P. R.....Rochester
Johnson, Ellsworth .....Rochester
Johnson, R. B.....Lanesboro
Johnson, Spencer.....Rochester
Johnson, W. R.....Rochester
Johnston, H. H.....Rochester
Joyce, G. T.....Rochester
Judd, E. S.....Rochester
Kegaries, D. L.....Rochester
Keith, N. M.....Rochester
Kennedy, F. S.....Rochester
Kennedy, R. L. J.....Rochester
Kepler, E. D.....Rochester
Kernohan, J. W.....Rochester
Keyes, H. C.....Rochester
Kilbourne, A. F.....Rochester
Kirch, W. A. W.....Rochester
Kirklin, B. R.....Rochester
Kirklin, O. L.....Rochester
Koelsche, G. A.....Rochester
Joyce, G. L.....Stewartville
Lannin, J. C.....Mabel
Lansbury, John .....Rochester
Larson, P. N.....Rochester
Leddy, E. T.....Rochester
Lemon, W. S.....Rochester
Lendrum, F. C.....Rochester
Lester, G. L.....Rochester
Lillie, H. I.....Rochester
Lillie, W. I.....Rochester
Lochead, D. C.....Rochester
Logan, A. H.....Rochester
Loney, W. R. R.....Rochester
Love, J. G.....Rochester
Luden, Georgine....Victoria, B. C., Can.
Lundy, J. S.....Rochester
Lymburner, R. M.....Rochester
Macy, J. W.....Rochester
Magath, T. B.....Rochester
Magee, H. R.....Rochester
Malerich, J. A.....Caledonia
Mann, F. C.....Rochester
Marble, W. P.....Rochester
Massey, B. D.....Rochester
Masson, D. M.....Rochester
Masson, J. C.....Rochester
Mayo, C. H.....Rochester
Mayo, C. W.....Rochester
Mayo, J. G.....Rochester
Mayo, W. J.....Rochester
Maytum, C. K.....Rochester
McCarty, W. C.....Rochester
McCuskey, C. F.....Rochester
McKaig, C. B.....Pine Island
McQuiston, J. S.....Rochester
McRoberts, J. W.....Rochester
Meade, J. R.....Rochester
Meyerding, H. W.....Rochester
Millet, R. F .....Rochester
Mills, S. D.....Rochester
Moersch, F. P.....Rochester
Moersch, H. J.....Rochester
Mohardt, J. H.....Rochester
Montgomery, Hamilton .....Rochester
Montgomery, Jimmie Ethel.....Rochester
Morey, J. B.....Rochester
Mueller, S. C.....Rochester
Murray, S. E.....Rochester
Mussey, R. D.....Rochester
Nass, H. A.....Mabel
Nehring, J. P.....Preston
New, G. B.....Rochester
Newell, C. E.....Rochester
Ohlinger, L. B.....Chicago, Ill.
O'Leary, P. A.....Rochester
Olson, E. A.....Pine Island
Olson, P. F.....Rochester
Onsgard, L. K., Sr.....Houston
Onsgard, L. K., Jr.....Houston
Overton, L. M.....Rochester
Pace, J. McI.....Rochester
Parker, H. L.....Rochester
Parkhill, Edith M.....Rochester
Pattee, G. L.....Rochester
Pemberton, J. de J.....Rochester
Peterson, V. L.....Rochester
Phillips, J. R.....Rochester
Piper, M. C.....Rochester
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Pollock, L. W.....Rochester
Popp, W. C.....Rochester
Prangen, A. D.....Rochester
Prickman, L. E.....Rochester
Priestley, J. T.....Rochester
Quade, R. H.....Rochester
Raaf, J. E.....Rochester
Randall, L. M.....Rochester
Rivers, A. B.....Rochester
Rixford, E. L.....Rochester
Robertson, H. E.....Rochester
Robins, C. R., Jr.....Rochester
Robinson, L. W.....Rochester
Rogin, J. R.....Rochester
Rosenow, E. C.....Rochester
Rudolph, E. A.....Rochester
Rynearson, E. H.....Rochester
Sanford, A. H.....Rochester
Scherer, R. G.....Rochester
Sheldon, W. D.....Rochester
Sloc mb, C. H.....Rochester
Smith, F. D.....Kasson
Smith, F. L.....Rochester
Smith, H. L.....Rochester
Smith, N. D.....Rochester
Snell, A. M.....Rochester
Spooner, A. D.....Rochester
Sprague, P. H.....Rochester
Stacy, L. J.....Rochester
Stafne, W. A.....Rochester
Stark, W. B.....Rochester
Starkey, T. A.....Rochester
Stephenson, G. W.....Rochester
Steven, George .....Byron
Stevens, G. A. W.....Rochester
Stuart, F. A., Jr.....Rochester
Stuck, W. G.....Rochester
Stuhler, L. G.....Rochester
Sutherland, C. G.....Rochester
Sutton, L. F.....Mazeppa
Swart, H. A.....Rochester
Thiessen, N. W.....Rochester
Thompson, G. J.....Rochester
Thorp, E. G.....Rochester
Tovell, R. M.....Rochester
Vanzant, Frances R.....Rochester
Vinson, P. P.....Rochester
Voldeng, K. E.....Rochester
Voris, H. C.....Rochester
Wagener, H. P.....Rochester
Waldron, G. W.....Rochester
Waller, L. M.....Rochester
Walters, Waltman .....Rochester
Watkins, C. H.....Rochester
Watson, J. R.....Rochester
Weber, H. M.....Rochester
Weir, J. F.....Rochester
Wellbrock, W. L. A.....Rochester
Welsh, A. L.....Rochester
Wilbur, D. L.....Rochester
Wilder, R. M.....Rochester

Wilkinsen, E. A. ..... Rochester
Williams, R. V. ..... Rushford
Willius, F. A. ..... Rochester
Wilson, L. B. ..... Rochester
Wolff, H. J. ..... Rochester
Woltman, H. W. ..... Rochester
Wood, G. T., Jr. ..... Rochester
Wood, H. G. ..... Rochester
Woodruff, C. W. ..... Chatfield

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Otter Tail, Wilkin, Grant and Douglas Counties
Regular meetings, second Wednesday of January, April, July and October
Annual meeting, second Wednesday in October

President
Broker, W. S. ..... Battle Lake

Secretary
Nelson, W. I. ..... Underwood

Baker, A. C. ..... Fergus Falls
Baker, N. H. ..... Fergus Falls
Benepe, J. L. ..... St. Paul
Boysen, Peter ..... Pelican Rapids
Broker, W. S. ..... Battle Lake
Burnap, W. L. ..... Fergus Falls
Combacker, L. C. ..... Fergus Falls
Drought, W. W. ..... Fergus Falls
Esser, John ..... Perham
Estrem, C. O. ..... Fergus Falls
Hand, W. R. ..... Elbow Lake
Haskell, A. D. ..... Alexandria
Heiberg, E. A. ..... Fergus Falls
Howard, Laura K. ..... Fergus Falls
Jacobs, G. C. ..... Fergus Falls
Johnson, O. V. ..... Fergus Falls
Kemp, M. W. ..... Fergus Falls
Kierland, P. E. ..... Alexandria
Lee, W. A. ..... Fergus Falls
Leibold, H. H. ..... Parkers Prairie
Lewis, A. J. ..... Henning
Love, F. A. ..... Carlos
Meckstroth, C. W. ..... Brandon
Naegeli, Frank ..... Fergus Falls
Nelson, O. N. ..... Battle Lake
Nelson, W. I. ..... Underwood
Parson, L. R. ..... Elbow Lake
Paulson, T. S. ..... Fergus Falls
Satersmoen, Theo ..... Pelican Rapids
Sather, E. R. ..... Alexandria
Serkland, J. C. ..... Rothsay
Tanquist, E. J. ..... Alexandria

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of every month except June, July and August
Annual meeting, last Monday in January

President
Oerting, Harry ..... St. Paul

Secretary
Schulze, A. G. ..... St. Paul

Abbott, J. S. ..... St. Paul
Ahrens, A. E. ..... St. Paul
Ahrens, A. H. ..... St. Paul
Alberts, M. W. ..... St. Paul
Alden, J. F. ..... St. Paul
Aldes, Harry ..... St. Paul
Alexander, F. H. ..... St. Paul
Allen, Mason ..... St. Paul
Armstrong, J. M. ..... St. Paul
Arnquist, A. S. ..... St. Paul
Aurelius, J. R. ..... St. Paul
Backus, A. S. ..... St. Paul
Bacon, D. K. ..... St. Paul
Bacon, Knox ..... St. Paul
Bacon, L. C. ..... St. Paul
Balcome, F. E. ..... St. Paul
Barry, L. W. ..... St. Paul
Barsness, Nellie ..... St. Paul
Beadie, W. D. ..... Cannons Falls
Beals, Hugh ..... St. Paul
Bell, C. C. ..... St. Paul
Bennion, P. H. ..... St. Paul
Bentley, N. P. ..... St. Paul
Berrisford, P. D. ..... St. Paul
Bicek, J. F. ..... St. Paul
Binger, H. E. ..... St. Paul
Birnberg, T. L. ..... St. Paul
Bock, R. A. ..... St. Paul
Boeckmann, Egil ..... St. Paul
Bohland, E. H. ..... St. Paul
Bole, R. S. ..... St. Paul
Borg, J. F. ..... St. Paul
Bouma, L. R. ..... St. Paul
Brand, G. D. ..... St. Paul
Bray, E. R. ..... St. Paul
Briggs, J. F. ..... St. Paul
Brodie, W. D. ..... St. Paul
Brown, E. I. ..... St. Paul
Brown, J. C. ..... St. Paul
Burch, F. E. ..... St. Paul
Burfiend, G. H. ..... St. Paul
Burns, F. W. ..... St. Paul
Burns, R. M. ..... St. Paul
Burton, C. G. ..... St. Paul
Busher, H. ..... St. Paul
Caldwell, J. P. ..... St. Paul
Caldwell, K. S. ..... St. Paul
*Cameron, J. A. ..... St. Paul
Campbell, J. E. ..... South St. Paul
Carroll, W. C. ..... St. Paul
Carter, F. G. ..... St. Paul
Chatterton, C. C. ..... St. Paul
Christiansen, A. ..... St Paul
Christison, J. T. ..... St. Paul
Clark, T. C. ..... Minneapolis
Colby, Woodard ..... St. Paul
Cole, W. H. ..... St. Paul
Collie, H. G. ..... St. Paul
Colvin, A. R. ..... St. Paul
Connor, C. E. ..... St. Paul
Countryman, R. S. ..... St. Paul
Cowern, E. W. ..... North St. Paul
Critchfield, L. R. ..... St. Paul
Crump, J. W. ..... St. Paul
Culligan, J. M. ..... St. Paul
Darling, J. B. ..... St. Paul
Daugherty, E. B. ..... St. Paul
Daugherty, L. E. ..... St. Paul
Davis, Herbert ..... St. Paul
Davis, William ..... St. Paul
Dedolph, Karl ..... St. Paul
Derauf, B. I. ..... St. Paul
Dickson, T. H., Jr. ..... St. Paul
Dittman, G. C. ..... St. Paul
Donohue, P. F. ..... St. Paul
Dovre, C. M. ..... St. Paul
Drake, C. B. ..... St. Paul
Dunn, J. N. ..... St. Paul
Earl, G. A. ..... St. Paul
Earl, R. O. ..... St. Paul
Edlund, G. ..... St. Paul
Ely, O. S. ..... South St. Paul
Emerson, E. C. ..... St. Paul
Endress, E. K. ..... St. Paul
Engberg, E. J. ..... St. Paul
Ernest, G. C. ..... South St. Paul
Eshelby, E. C. ..... St. Paul
Fahey, E. W. ..... St. Paul
Ferguson, J. C. ..... St. Paul
Fesler, H. H. ..... St. Paul
Flanagan, H. F. ..... St. Paul
Fogarty, C. W. ..... St. Paul
Fogelberg, E. J. ..... St. Paul
Foley, F. E. B. ..... St. Paul
Freeman, C. D. ..... St. Paul
Gager, E. C. ..... St. Paul
Garbrecht, Arthur ..... St. Paul
Gardiner, D. G. ..... St. Paul
Gardner, W. P. ..... St. Paul
Geer, E. K. ..... St. Paul
Gehlen, J. N. ..... St. Paul
Geist, G. A. ..... St. Paul
Ghent, C. H. ..... St. Paul
Ghent, M. M. ..... St. Paul
Gibbs, E. C. ..... St. Paul
Gilfillan, J. S. ..... St. Paul
Ginsberg, William ..... St. Paul
Goltz, E. V. ..... St. Paul
Grant, H. W. ..... St. Paul
Gratzek, Thomas ..... St. Paul
Gruenhagen, A. P. ..... St. Paul
Hagaman, G. K. ..... St. Paul
Hall, A. R. ..... St. Paul
Hall, H. H. ..... St. Paul
Hammes, E. M. ..... St. Paul
Hammond, J. F. ..... St. Paul
Harmon, G. E. ..... St. Paul
Hartfiel, W. F. ..... St. Paul
Hartley, E. C., Jr. ..... St. Paul
Hauser, V. P. ..... St. Paul
Hawkins, V. J. ..... St. Paul
Heath, A. C. ..... St. Paul
Heck, W. W. ..... St. Paul
Hedenstrom, F. G. ..... St. Paul
Hengstler, W. H. ..... St. Paul
Hensel, C. N. ..... St. Paul
Herrmann, E. T. ..... St. Paul
Hesselgrave, S. S. ..... St. Paul
Hilger, A. W. ..... St. Paul
Hilger, D. D. ..... St. Paul
Hilger, L. A. ..... St. Paul
Hochfilzer, J. J. ..... St. Paul
Hoff, Alfred ..... St. Paul
Hoffman, M. H. ..... St. Paul
Holcomb, J. T. ..... St. Paul
Holcomb, O. W. ..... St. Paul
Holt, J. E. ..... St. Paul
Howard, W. S. ..... St. Paul
Hultkrans, J. C. ..... St. Paul
Ide, A. W. ..... St. Paul
Ikeda, Kano ..... St. Paul
Johnson, A. M. ..... St. Paul
Johnson, H. C. ..... St. Paul
Johnson, J. A. ..... St. Paul
Johnson, R. G. ..... St. Paul
Johnson, T. H. ..... St. Paul
Jones, D. C. ..... St. Paul
Jones, E. M. ..... St. Paul
Kadesky, David ..... St. Paul
Kammon, G. R. ..... St. Paul
Kannary, E. L. ..... St. Paul
Kasper, E. M. ..... St. Paul
Kelly, J. V. ..... St. Paul
Kelly, P. H. ..... St. Paul
Kenefick, E. V. ..... St. Paul
Kennedy, W. A. ..... St. Paul
Kesting, Herman ..... St. Paul
King, G. L. ..... St. Paul
King, Z. P. ..... St. Paul
Klein, H. N. ..... St. Paul
Knauff, M. K. ..... St. Paul
Kvitrud, G. ..... St. Paul
Langenderfer, F. V. ..... St. Paul
Larsen, C. L. ..... St. Paul
Lax, M. H. ..... St. Paul
Leahy, Bartholomew ..... St. Paul
Leavenworth, R. O. ..... St. Paul
Leitch, Archibald ..... St. Paul
Leonard, G. J. ..... St. Paul
Lepak, J. A. ..... St. Paul
Lerche, William ..... Cable, Wis.
Levin, Bert ..... St. Paul
Lewis, W. W. ..... St. Paul
Lick, C. L. ..... St. Paul
Lippman, H. S. ..... St. Paul
Little, W. J. ..... St. Paul
Lowe, E. R. ..... South St. Paul
Lowe, T. A. ..... South St. Paul
Lundholm, A. M. ..... St. Paul
Madden, J. F. ..... St. Paul
Martineau, J. L. ..... St. Paul
Mattson, C. H. ..... St. Paul
McBeath, E. C. ..... New York, N. Y.
McCarthy, W. R. ..... St. Paul
McCloud, C. N. ..... St. Paul
McKeon, Owen ..... St. Paul
McLaren, Jennette M. ..... St. Paul
McNevin, C. F. ..... St. Paul
Meyerding, E. A. ..... St. Paul
Moga, J. A. ..... St. Paul
Mogilner, S. N. ..... St. Paul
Molander, H. A. ..... St. Paul
Moquin, Marie A. ..... St. Paul
Moran, T. R. ..... St. Paul
Morrissey, F. B. ..... St. Paul
Mortenson, N. G. ..... St. Paul
Moss, M. N. ..... St. Paul
Moynihan, T. J. ..... St. Paul
Muller, R. T. ..... St. Paul
Myers, Thomas ..... St. Paul
Naegeli, A. E. ..... St. Paul

*Deceased.

Neher, F. H. St. Paul
Nelson, L. A. St. Paul
Nippert, H. T. St. Paul
Noble, J. F. St. Paul
Nordin, C. G. St. Paul
Nye, Katherine A. St. Paul
Nye, Lillian L. St. Paul
O'Connor, L. J. St. Paul
Oerting, Harry St. Paul
Ogden, Warner St. Paul
Ohage, Justus St. Paul
Ohage, Justus, Jr. St. Paul
Olson, C. A. St. Paul
O'Reilley, B. E. St. Paul
Ostergren, E. W. St. Paul
Page, C. V. St. Paul
Pearson, F. R. St. Paul
Pedersen, A. H. St. Paul
Perry, C. G. St. Paul
Peterson, V. N. St. Paul
Plondke, F. J. St. Paul
Prendergast, H. J. St. Paul
Ramsey, W. R. St. Paul
Richards, E. T. F. St. Paul
Richardson, H. E. St. Paul
Ritchie, H. P. St. Paul
Rogers, J. T. St. Paul
Rosenberger, H. P. St. Paul
Rosenholtz, Burton St. Paul
Rosenthal, Robert St. Paul
Rothrock, J. L. St. Paul
Rothschild, H. J. St. Paul
Roy, Philemon St. Paul
Ruhberg, G. N. St. Paul
Rutherford, W. C. St. Paul
Ryan, J. J. St. Paul
Ryan, J. M. St. Paul
Ryan, M. E. St. Paul
Satterlund, V. L. St. Paul
Savage, F. J. St. Paul
Schoch, R. B. St. Paul
Schons, Edward St. Paul
Schuldt, F. C. St. Paul
Schulze, A. G. St. Paul
Schwyzer, Arnold St. Paul
Scott, E. E. St. Paul
Senkler, G. E. St. Paul
Setzer, H. J. St. Paul
Shannon, W. R. St. Paul
Shellman, J. L. St. Paul
Shillington, M. A. St. Paul
Short, Jacob St. Paul
Simon, B. F. St. Paul
Singer, B. J. St. Paul
Skinner, H. O. St. Paul
Snyder, G. W. St. Paul
Sohlberg, O. I. St. Paul
Souster, B. B. St. Paul
Sprafka, J. M. St. Paul
Steinberg, C. L. St. Paul
Sterner, E. G. St. Paul
Stewart, Alexander St. Paul
Stierle, Adolph, Jr. St. Paul
Stinnette, S. E. St. Paul
Stoeckmann, A. E. St. Paul
Stolpestad, H. L. St. Paul
Strate, G. E. St. Paul
Swanson, E. O. St. Paul
Swanson, J. A. St. Paul
Swendson, J. J. St. Paul
Teisberg, C. B. St. Paul
Tifft, C. R. St. Paul
Tregilgas, H. R. South St. Paul
Van Slyke, C. A. St. Paul
Veirs, Dean St. Paul
Veirs, Ruoy S. St. Paul
Von der Weyer, William St. Paul
Waas, C. W. St. Paul
Warnock, R. W. St. Paul
Warren, E. L. St. Paul
Webber, F. L. St. Paul
Welch, M. C. St. Paul
Werner, O. S. Cambridge
Wheeler, M. W. St. Paul
Whitacre, J. C. St. Paul
Whitcomb, E. H. St. Paul
Whitmore, Frank St. Paul
Williams, C. K. St. Paul
Williamson, G. A. St. Paul
Wilson, J. A. St. Paul
Wilson, J. V. St. Paul
Winnick, J. B. St. Paul
Wold, K. C. St. Paul
Youngren, E. R. St. Paul
Zimmermann, H. B. St. Paul

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Marshall, Pennington, Polk, Red Lake, Roseau, Norman and Mahnomen Counties
Regular meetings, second Tuesday in April, September and December
Annual meeting, second Tuesday in December

President
Hodgson, H. H. Crookston

Secretary
Oppegaard, C. L. Crookston

Adkins, C. M. Thief River Falls
Anderson, W. S. Minneapolis
Benson, T. O. East Grand Forks
Berge, D. O. Roseau
Bernard, B. C. Thief River Falls
Bertelson, O. L. Crookston
Blegen, H. M. Warren
Bohl, G. W. Ada
Bowers, J. T. Thief River Falls
Bratrud, O. E. Thief River Falls
Brown, L. L. Crookston
Culver, L. G. Thief River Falls
Delmore, J. L. Roseau
Dunlop, A. H. Crookston
Engstrand, O. J. Minneapolis
Erickson, Eskil Halstad
Froats, C. W. Thief River Falls
Froehlich, H. W. Minneapolis
Henney, W. H. McIntosh
Hodgson, H. H. Crookston
Hollands, W. H. Fisher
Holmstrom, C. H. Warren
Holte, Halvor Crookston
Kahala, Arthur Pasadena, Calif.
Kirk, G. P. East Grand Forks
Leitch, N. M. Warroad
Locken, O. E. Crookston
Lynde, O. G. Thief River Falls
Mellby, O. F. Thief River Falls
Mercil, W. F. Crookston
Morley, G. A. Crookston
Nelson, H. E. Crookston
Norman, J. F. Crookston
Oppegaard, C. L. Crookston
Oppegaard, M. O. Crookston
Overend, K. V. Hallock
Paradis, W. G. Crookston
Parsons, J. G. Crookston
Reff, A. R. Crookston
Roy, J. A. Red Lake Falls
Shedlov, A. Fosston
Shelland, J. T. Ada
Smith, A. M. Thief River Falls
Stuurmanns, S. H. Erskine
Swedenburg, A. W. Thief River Falls
Torgerson, W. B. Oklee
Turnbull, Robert Fosston
Watson, N. M. Red Lake Falls
Wattam, G. S. Warren
Wiltrout, I. G. Oslo

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meetings, first Tuesday of winter months
Annual meeting, May

President
Seifert, O. J. New Ulm

Secretary
Meierding, W. A. New Ulm

Abraham, A. L. Gibbon
Dubbe, F. H. New Ulm
Dysterheft, A. F. Gaylord
Fritsche, Albert New Ulm
Fritsche, C. J. New Ulm
Goblirsch, A. P. Sleepy Eye
Graham, W. D. Hanska
Hammermeister, T. F. New Ulm
Jamieson, Earl Walnut Grove
Johnson, W. E. Morgan
Just, H. J. Lafayette
Kolset, C. D. Sanborn
Kusske, A. L. New Ulm
Lindahl, M. J. Winthrop
McLane, Evelyn G. Sleepy Eye
McLane, W. O. Sleepy Eye
Meierding, W. A. New Ulm
Peterson, R. A. Vesta
Reineke, G. F. New Ulm
Rothenburg, J. C. Springfield
Saffert, C. A. New Ulm
Schoch, J. L. New Ulm
Seifert, O. J. New Ulm
Shrader, J. S. Wheaton
Vogel, H. A. L. New Ulm
Vogel, J. H. New Ulm
Weiser, G. B. New Ulm
Wellcome, J. W. B. Sleepy Eye
Weichman, F. H. Young America
Wohlrabe, Clarence Springfield
Wohlrabe, E. J. Springfield

RICE COUNTY MEDICAL SOCIETY

Annual meeting, December

President
Murdoch, J. M. Faribault

Secretary
Plonske, C. J. Faribault

Babcock, F. M. Northfield
Beede, Ethel R. Faribault
Davis, F. U. Faribault
Dugan, L. F. Faribault
Dungay, N. S. Northfield
Engstrom, F. A. Wanamingo
Francis, D. W. Faribault
Gaida, J. B. Kilkenny
Haessly, S. B. Faribault
Hanson, A. M. Faribault
Haynes, A. L. Faribault
Huxley, F. R. Faribault
Kanne, C. W. Faribault
Kuske, A. W. Faribault
Lane, Laura A. Northfield
Lende, Norman Faribault
Lexa, F. J. Lonsdale
Mayland, M. L. Faribault
Meyer, P. F. Faribault
Moses, Joseph, Jr. Northfield
Murdoch, J. M. Faribault
Nickerson, W. S. Faribault
Plonske, C. J. Faribault
Robilliard, C. M. Faribault
Rohrer, C. A. Waterville
Rudie, C. N. Kenyon
Rumpf, C. W. Faribault
Rumpf, W. H. Faribault
Seeley, I. F. Northfield
Smith, P. A. Faribault
Stewart, Gwendolyn Faribault
Stiles, Angie G. Northfield
Thorson, O. P. Northfield
Traeger, C. A. Faribault
Warren, F. S. Washington, D. C.
Wilkowske, R. J. Nerstrand
Wilson, Warren Northfield
Wilson, W. E. Northfield

ST. LOUIS COUNTY MEDICAL SOCIETY

St. Louis, Lake, Cook, Carlton and Itasca Counties
Regular meetings, second Thursday each month
Annual meeting, October

President
Scherer, C. A. — Duluth
Secretary
Fischer, M. McC. — Duluth

Adams, B. S. — Hibbing
Alexander, C. E. — Duluth
Armstrong, E. L. — Duluth
Athens, A. G. — Duluth
Ayres, G. T. — Ely
Bardon, Richard — Duluth
Bartels, E. C. — Duluth
Berdez, G. L. — Duluth
Bergquist, K. E. — Duluth
Bianco, A. J. — Duluth
Binet, H. E. — Grand Rapids
Blacklock, S. S. — Hibbing
Blakely, C. C. — Barnum
Boman, P. G. — Duluth
Boyer, S. H. — Duluth
Braverman, N. J. — Duluth
Bray, C. W. — Biwabik
Bullen, F. W. — Hibbing
Burns, R. L. — Two Harbors
Cantwell, W. F. — International Falls
Carstens, C. F. — Hibbing
Chapman, T. L. — Duluth
Cheney, E. L. — Duluth
Christensen, E. P. — Two Harbors
Clement, Gage — Duluth
Collins, A. N. — Duluth
Collins, H. C. — Duluth
Coventry, W. A. — Duluth
Davis, B. F. — Duluth
Doolittle, L. E. — Duluth
Doyle, G. C. — Duluth
Drenning, F. C. — Duluth
Eckman, P. F. — Duluth
Ekblad, J. W. — Duluth
Elias, F. J. — Duluth
Emanuel, K. W. — Duluth
Eppard, R. M. — Cloquet
Fellows, M. F. — Duluth
*Ferreira, G. J. — Duluth
Fischer, M. McC. — Duluth
Fischer, J. M. — Proctor
Forbes, R. S. — Duluth
Gillespie, M. G. — Duluth
Gillespie, N. H. — Duluth
Goldish, D. R. — Duluth
Gowan, L. R. — Duluth
Graham, David — Duluth
Graham, R. D. — Duluth
Graham, Robert — Duluth
Graves, W. N. — Duluth
Haney, C. L. — Duluth
Hanover, R. D. — Littlefork
Harris, C. N. — Hibbing
Hatch, W. E. — Duluth
Hathaway, S. J. — Proctor
Hayes, M. F. — Nashwauk
Hedberg, G. A. — Nopeming
Heimark, O. E. — Duluth
Hilding, A. C. — Duluth
Hirschboeck, F. J. — Duluth
Huseby, H. W. — Floodwood
Jacobson, Clarence — Chisholm
Jensen, T. J. — Duluth
Jolin, F. B. — Coleraine
Keyes, C. R. — Duluth
Kiesling, I. H. — Nashwauk
Klein, Harry — Duluth
Kliman, F. E. — Duluth
Knapp, F. N. — Duluth
Kohlbry, C. O. — Duluth
Kotchevar, F. R. — Eveleth
Kraft, Peter — Duluth
Kuth, J. R. — Duluth
Laird, A. T. — Nopeming
Lamont, J. G. — Nopeming
Leckband, Norbert — Buhl
Lenont, C. B. — Virginia
Lepak, F. J. — Duluth
Litman, S. N. — Duluth
Loofbourrow, E. H. — Keewatin
Lum, C. E. — Duluth
Macfarlane, P. H. — Chisholm
MacRae, G. C. — Duluth
Magney, F. H. — Duluth
Manley, J. R. — Duluth
Martin, E. T. — Duluth
Martin, W. C. — Duluth
Mayne, R. M. — Duluth
McCarty, P. D. — Ely
McComb, C. F. — Duluth
McCoy, Mary K. — Duluth
McDonald, A. L. — Duluth
McHaffie, O. L. — Duluth
McNutt, J. R. — Duluth
Merriman, L. L. — Duluth
Miners, G. A. — Deer River
Moe, R. J. — Duluth
Monroe, P. B. — Two Harbors
Mooney, L. P. — Marble
More, C. W. — Eveleth
Morss, C. R. — Zumbrota
Nelson, E. H. — Chisholm
Nelson, R. L. — Duluth
Nicholson, M. A. — Duluth
Olson, A. E. — Duluth
Parker, O. W. — Ely
Pennie, D. F. — Duluth
Peterson, E. N. — Eveleth
Power, J. E. — Duluth
Raadquist, C. S. — Montevideo
Raiter, F. W. S. — Cloquet
Raiter, R. F. — Cloquet
Robinson, J. M. — Duluth
Rood, D. C. — Duluth
Rouse, J. J. — Nopeming
Rowe, O. W. — Duluth
Rudie, P. S. — Duluth
Ryan, W. J. — Duluth
Samson, E. R. — Chisholm
Sarff, O. E. — Buhl
Schroder, C. H. — Duluth
Seashore, D. E. — Duluth
Shapiro, E. Z. — Duluth
Shastid, T. H. — Duluth
Sinamark, Andrew — Hibbing
Slyfield, F. F. — Duluth
Smith, C. M. — Duluth
Smith, E. K. — Duluth
Smith, W. R. — Grand Marais
Spicer, F. W. — Duluth
Strathern, M. L. — Gilbert
Strobel, W. G. — Duluth
Sutherland, H. N. — Ely
Swenson, A. O. — Duluth
Taylor, C. W. — Duluth
Tibbetts, M. H. — Duluth
Tilderquist, D. L. — Duluth
Tuohy, E. L. — Duluth
Urberg, S. E. — Duluth
Vercellini, C. E. — Duluth
Walker, A. E. — Duluth
Webber, E. E. — Duluth
West, E. J. — Duluth
Wheeler, D. W. — Duluth
Wilkinson, Stella — Duluth
Winter, J. A. — Duluth
Young, T. O. — Duluth
Young, V. A. — Duluth

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday each month
Annual meeting, second Tuesday in June

President
Simons, B. H. — Chaska
Secretary
Cervenka, C. F. — New Prague

Buck, F. H. — Shakopee
Cervenka, C. F. — New Prague
Eklund, E. J. — Norwood
Emmerson, W. S. — Mayer
Fischer, H. P. — Shakopee
Fischer, P. M. — Shakopee
Halgren, H. A. — Watertown
Hebeisen, M. B. — Chaska
Hospodarsky, L. J. — New Prague
Juergens, H. M. — Belle Plaine
Lightbourn, E. T. — Jordan
McKeon, James — St. Paul
Maertz, W. F. — New Prague
Martin, T. P. — Arlington
Nagel, H. D. — Waconia
Novak, E. E. — New Prague
Olson, C. J. — Belle Plaine
Ormond, Douglas — Waconia
Phillips, W. H. — Jordan
Reiter, H. W. — Shakopee
Schimelpfenig, G. T. — Chaska
Schneider, H. A. — Jordan
Simons, B. H. — Chaska
Simons, L. T. — Shakopee
Westerman, A. E. — Montgomery
Westerman, F. C. — Montgomery
Woodworth, L. F. — Le Center
Wunder, H. E. — Shakopee

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Pipestone, Rock, Murray, Nobles, Cottonwood and Jackson Counties
Regular meetings, May and October
Annual meeting, October

President
Rose, J. T. — Lakefield
Secretary
McKeown, E. G. — Pipestone

Arnold, E. W. — Adrian
Basinger, H. P. — Windom
Basinger, H. R. — Mountain Lake
Benjamin, W. G. — Pipestone
Bofenkamp, F. W. — Luverne
Brown, A. H. — Pipestone
Chadbourn, A. G. — Heron Lake
Cress, P. J. — Ellsworth
De Boer, Hermanus — Edgerton
Dolan, C. P. — Worthington
Doms, H. C. — Slayton
Hitchings, W. S. — Lakefield
Kelling, L. F. — Lakefield
Kendahl, A. M. — Jasper
Kilbride, E. A. — Worthington
Larson, J. T. — Lake Wilson
McCrea, J. M. — Fulda
McKeown, E. G. — Pipestone
Mork, B. O. — Worthington
Mork, B. O. Jr. — Worthington
Patterson, W. E. — Westbrook
Pertl, A. L. — Windom
Piper, W. A. — Mountain Lake
Portmann, W. C. — Jackson
Rose, J. T. — Lakefield
Schutz, E. S. — Mountain Lake
Sherman, C. L. — Luverne
Slater, S. A. — Worthington
Smallwood, J. T. — Worthington
Sogge, L. L. — Windom
Stanley, C. R. — Worthington
Thorson, E. O. — Luverne
Tofte, Josephine — Dawson
Waller, J. D. — Wilmont
Williams, A. B. — St. Paul
Williams, L. A. — Slayton
Wright, C. O. — Luverne

*Deceased

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday of the month
Annual meeting, third Thursday in December

President
Gelz, J. J.....St. Cloud
Secretary
Libert, J. N.....St. Cloud

Buening, J. B.....Albany
Boardman, D. V.....St. Cloud
Brigham, C. F.....St. Cloud
Buscher, J. C.....St. Cloud
Du Bois, J. A.....Sauk Center
Du Bois, J. F.....Sauk Center
Engstrom, G. F.....Belgrade
Freeman, W. L.....St. Cloud
Friesleben, William.....Sauk Rapids
Gelz, J. J.....St. Cloud
Goehrs, H. W.....St. Cloud
Haberman, E.....Osakis
Hemstead, Werner.....St. Cloud
Kingsbury, E. M.....Clearwater
Kohler, D. W.....St. Joseph
Koop, S. H.....Richmond
Kuhlmann, August.....Melrose
Johnson, Walfred.....Sauk Center
Jones, R. N.....St. Cloud
Lewis, C. B.....St. Cloud
Libert, J. N.....St. Cloud
Mahowald, A.....Albany
McDowell, J. P.....St. Cloud
Meyer, A. A.....Melrose
Moynihan, A. F.....Sauk Center
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Richards, W. B.....St. Cloud
Ridgway, Alexander.....South Haven
Rydburg, W. C.....Brooten
Schatz, F. J.....St. Cloud
Sherwood, G. E.....Kimball
Stangl, Fred.....St. Cloud
Stickney, Charlotte A.....St. Cloud
Sutton, C. S.....St. Cloud
Wenner, W. T.....St. Cloud
Zachman, A. H.....Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday odd months
Annual meeting, last meeting of year

President
McIntyre, J. A.....Owatonna
Secretary
Dewey, D. H.....Owatonna

Dewey, D. H.....Owatonna
Farabaugh, C. L.....Owatonna
Kreuzer, T. C.....Owatonna
McEnaney, C. T.....Owatonna
McIntyre, J. A.....Owatonna
Melby, Benedik.....Blooming Prairie
Morehead, D. E.....Owatonna
Nelson, E. J.....Owatonna
Roberts, O. W.....Owatonna
Schaefer, J. F.....Owatonna
Senn, E. W.....Owatonna
Smersh, J. F.....Owatonna
Stewart, A. B.....Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Crow Wing, Morrison, Cass, Todd, Wadena, Clearwater, Koochiching, Hubbard and Beltrami Counties
Regular meetings, Spring, Summer, Fall
Annual meeting, January

President
Shannon, S. S.....Crosby
Secretary
Badeaux, G. I.....Brainerd

Agnew, A. T.....International Falls
Badeaux, G. I.....Brainerd
Beise, R. A.....Brainerd
Borgerson, A. H.....Hewitt
Borreson, Baldwin.....Ah-Gwah-Ching
Bosland, H. G.....Verndale
Cook, J. M.....Staples
Corrigan, J. E.....Spooner
Feldman, F. M.....Ah-Gwah-Ching
Garlock, A. V.....Bemidji
Garlock, D. H.....Bemidji
Gerber, M. P.....Brainerd
Ghostley, Mary C.....Puposky
Gilmore, Rowland.....Bemidji
Grawn, F. A.....Northome
Groschupt, T. P.....Bemidji
Grose, F. N.....Clarissa
Hanson, E. C.....Park Rapids
Hawkinson, L. F.....Brainerd
Healy, R. T.....Pierz
Hendrickson, R. R.....Wadena
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
House, Z. E.....Cass Lake
Hubbard, O. E.....Brainerd
Hubin, E. G.....Deerwood
Jacobson, D. J.....Blackduck
Johnson, E. W.....Bemidji
Kelly, B. W.....Aitkin
Kerlan, S. Z.....Aitkin
Lamb, H. L.....Little Falls
Larson, L. M.....Oak Terrace
Laughlin, J. T.....Grey Eagle
Lund, W. J.....Staples
Marcum, E. H.....Bemidji
Mark, Hilbert.....Ah-Gwah-Ching
McHugh, R. F.....Aitkin
Miller, W. A.....New York Mills
Mosby, M. E.....Browerville
Moyer, R. E.....Bemidji
Nelson, Nesmith.....Brainerd
Quanstrom, V. E.....Brainerd
Ringle, O. F.....Walker
Roberts, L. M.....Little Falls
Shannon, S. S.....Crosby
Simons, E. J.....Swanville
Smith, B. A.....Crosby
Smith, E. H.....Bemidji
Stevens, John.....Gonvik
Thabes, J. A., Sr.....Brainerd
Van Valkenburg, B. F.....Long Prairie
Watson, J. D.....Holdingford
Will, W. W.....Bertha
Withrow, M. E.....International Falls

WABASHA COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday after the first Monday in July

President
Stryker, W. B.....Plainview
Secretary
Wilson, W. F.....Lake City

Bayley, E. C.....Lake City
Bowers, H. E.....Lake City
Cochrane, W. J.....Lake City
Collins, J. S.....Wabasha
Fleischhauer, D. S.....Wabasha
Frost, R. H.....Wabasha
Radabaugh, R. C.....Hastings
Slocumb, J. A.....Plainview
Stryker, W. B.....Plainview
Wilson, W. F.....Lake City

WASECA COUNTY MEDICAL SOCIETY

Regular meetings, at call of President
Annual meeting, third Friday in December

President
Gallagher, B. J.....Waseca
Secretary
Tavenner, J. L.....Waseca

Bernstein, W. C.....New Richland
Gallagher, B. J.....Waseca
Hagen, H. O.....New Richland
Hottinger, R. C.....Janesville
McIntire, H. M.....Waseca
Oeljen, S. C. G.....Waseca
Swenson, O. J.....Waseca
Tavenner, J. L.....Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of every month except June, July and August
Annual meeting, second Tuesday in December

President
Josewski, R. J.....Stillwater
Secretary
Boleyn, E. S.....Stillwater

Boleyn, E. S.....Stillwater
Brekke, H. J.....Stillwater
Brooks, G. F.....Stillwater
Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Josewski, R. J.....Stillwater
Kalinoff, D.....Stillwater
Poirier, J. A.....Forest Lake
Ruggles, G. McC.....Stillwater
Strand, E. V.....Bayport
Stuhr, J. W.....Stillwater
Thompson, V. C.....Marine-on-St. Croix
Van Meier, Henry.....Stillwater

WATONWAN COUNTY MEDICAL SOCIETY

Annual meeting, December

President
Bregel, F. L. ..... St. James

Secretary
Grimes, H. B. ..... Madelia

Bergman, O. B. ..... St. James
Bratrude, E. J. ..... St. James
Bregel, F. L. ..... St. James
Grimes, H. B. ..... Madelia
Hagen, O. E. ..... Butterfield
McCarthy, W. J. ..... Madelia
Thompson, Albert ..... St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Traverse, Pope and Stevens Counties
Regular meetings, twelfth of January, April, July and October
Annual meeting, October 12

President
Giesen, A. F. ..... Starbuck

Secretary
Lindberg, A. L. ..... Wheaton

Bergan, Otto ..... Clinton
Caine, C. E. ..... Morris
Eberlin, E. A. ..... Glenwood
Ewing, C. F. ..... Wheaton
Fitzgerald, E. T. ..... Morris
Giesen, A. F. ..... Starbuck
Karn, B. R. ..... Ortonville
Lindberg, A. L. ..... Wheaton
Ransom, M. L. ..... Hancock

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, first Monday in January, April, July and October
Annual meeting, first Monday in January

President
Keyes, J. D. ..... Winona

Secretary
Steiner, I. W. ..... Winona

Benoit, F. T. ..... Winona
Christensen, E. E. ..... Winona
Clay, F. H. ..... St. Charles
Dierkes, G. J. ..... Rollingstone
Dukelow, D. A. ..... St. Charles
Heise, W. F. C. ..... Winona
Keyes, E. D. ..... Winona
Keyes, J. D. ..... Winona
Lichtenstein, H. ..... Winona
Mattison, P. A. ..... Winona
McLaughlin, E. M. ..... Winona
Meinert, A. E. ..... Winona
Nauth, W. W. ..... Winona
Neumann, C. A. ..... Winona
Page, R. L. ..... St. Charles
Risser, E. D. ..... Winona
Robbins, C. P. ..... Winona
Satterlee, H. W. ..... Lewiston
Schaefer, S. ..... Winona
Steiner, I. W. ..... Winona
Tweedy, G. J. ..... Winona
Walker, G. H. ..... Winona
Wilson, R. H. ..... Winona
Younger, L. I. ..... Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meeting, first Tuesday after the first Monday quarterly
Annual meeting, October

President
Bendix, L. H. ..... Annandale

Secretary
Catlin, J. J. ..... Buffalo

Anderson, W. P. ..... Buffalo
Bendix, L. H. ..... Annandale
Catlin, J. J. ..... Buffalo
Ellison, F. E. ..... Monticello
Harriman, L. ..... Howard Lake
Hart, W. E. ..... Monticello
Johnson, V. P. ..... Delano
Klaveness, E. ..... St. Paul
Lee, J. L. ..... Watertown
Olson, J. W. ..... Cokato
Peterson, O. L. ..... Cokato
Ridgway, A. M. ..... Annandale
Roholt, C. L. ..... Waverly
Rousseau, Victor ..... Maple Lake
Swezey, B. F. ..... Buffalo

ALPHABETICAL ROSTER

Aanes, A. M.....Red Wing
Abbott, J. S.....St. Paul
Aborn, W. H.....Hawley
Abraham, A. L.....Gibbon
Adams, B. S.....Hibbing
Adams, R. C.....Bird Island
Adams, R. T.....Mantorville
Adkins, C. M.....Thief River Falls
Adson, A. W.....Rochester
Affeldt, D. E.....Kasson
Agnew, A. T.....International Falls
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Ahrens, R. S.....Minneapolis
Aitkens, H. B.....Le Center
Akester, Ward.....Marshall
Albers, E. C.....Rochester
Alberts, M. W.....St. Paul
Alden, J. F.....St. Paul
Alderson, L. R.....Rochester
Aldes, Harry.....St. Paul
Alexander, C. E.....Duluth
Alexander, F. H.....St. Paul
Allen, A. W.....Austin
Allen, C. C.....Austin
Allen, E. V.....Rochester
Allen, H. W.....Minneapolis
Allen, Mason.....St. Paul
Allen, R. B.....Rochester
Allen, W. A.....Rochester
Allison, R. G.....Minneapolis
Almquist, H. E.....Minneapolis
Altnow, H. O.....Minneapolis
Alvarez, W. C.....Rochester
Amberg, Samuel.....Rochester
Andersen, A. G.....Minneapolis
Andersen, S. C.....Minneapolis
Anderson, C. M.....Rochester
Anderson, C. R.....Rochester
Anderson, D. D.....Minneapolis
Anderson, E. D.....Minneapolis
Anderson, E. R.....Minneapolis
Anderson, F. J.....Minneapolis
Anderson, J. K.....Minneapolis
Anderson, K. W.....Minneapolis
Anderson, M. J.....Rochester
Anderson, N. E.....Harmony
Anderson, P. A.....Minneapolis
Anderson, R. E.....Willmar
Anderson, S. H.....Red Wing
Anderson, U. S.....Minneapolis
Anderson, W. P.....Buffalo
Anderson, W. S.....Minneapolis
Andreassen, E. C.....Minneapolis
Andrews, R. N.....Mankato
Annis, H. B.....Minneapolis
Archibald, F. M.....Mahnomen
Arends, A. L.....Askov
Arey, H. C.....Excelsior
Armstrong, E. L.....Duluth
Armstrong, J. M.....St. Paul
Arnold, E. W.....Adrian
Arnquist, A. S.....St. Paul
Arnson, J. M.....Benson
Arvidson, C. G.....Minneapolis
Athens, A. G.....Duluth
Atkinson, Walter.....Rochester
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Aurelius, J. R.....St. Paul
Avery, J. F.....Minneapolis
Ayres, G. T.....Ely

Babcock, F. M.....Northfield
Backus, A. S.....St. Paul
Bacon, D. K.....St. Paul
Bacon, Knox.....St. Paul
Bacon, L. C.....St. Paul
Bacon, R. S.....Montevideo
Badeaux, G. I.....Brainerd
Bailey, H. B.....Fairmont
Baken, M. P.....Minneapolis
Baker, A. C.....Fergus Falls
Baker, A. T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, H. R.....Hayfield
Baker, Looe.....Minneapolis
Baker, N. H.....Fergus Falls
Balcome, F. E.....St. Paul
Balfour, D. C.....Rochester
Bannick, E. G.....Rochester
Barber, J. P.....Minneapolis
Barber, K. W.....Rochester
Bardon, Richard.....Duluth
Bargen, J. A.....Rochester
Barker, N. W.....Rochester
Barnes, A. R.....Rochester
Barr, W. H.....Wells
Barron, Moses.....Minneapolis
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Bartels, E. C.....Duluth
Basinger, H. P.....Windom
Basinger, H. R.....Mountain Lake
Bass, G. W.....Minneapolis
Baxter, S. H.....Minneapolis
Bayley, E. C.....Lake City
Beadie, W. D.....Cannon Falls
Beals, Hugh.....St. Paul
Beard, A. H.....Minneapolis
Beard, R. O.....Minneapolis
Bedford, E. W.....Minneapolis
Beede, E. R.....Faribault
Behmler, F. W.....Appleton
Beise, R. A.....Brainerd
Beiswanger, R. H.....Wykoff
Bell, C. C.....St. Paul
Bell, E. T.....Minneapolis
Bell, J. W.....Minneapolis
Belote, G. B.....Caledonia
Bendix, L. H.....Annandale
Benedict, E. E.....Minneapolis
Benedict, W. L.....Rochester
Benepe, J. L.....St. Paul
Benham, E. W.....Mankato
Benjamin, A. E.....Minneapolis
Benjamin, W. G.....Pipestone
Benn, F. G.....Minneapolis
Bennett, R. J., Jr.....Rochester
Bennion, P. H.....St. Paul
Benoit, F. T.....Winona
Benson, T. Q.....East Grand Forks
Bentley, N. P.....St. Paul
Berdez, G. L.....Duluth
Bergan, Otto.....Clinton
Berge, D. O.....Roseau
Berger, E. H.....Rochester
Bergh, L. N.....Montevideo
Bergheim, M. C.....Hawley
Bergman, O. B.....St. James
Bergquist, K. E.....Duluth
Berkman, D. M.....Rochester
Berkman, J. M.....Rochester
Berkwitz, N. J.....Minneapolis
Bernard, B. C.....Thief River Falls
Bernstein, W. C.....New Richland
Berrisford, P. D.....St. Paul
Bertelson, O. L.....Crookston
Bessesen, A. N., Sr.....Minneapolis
Bessesen, A. N., Jr.....Minneapolis
Bessesen, D. H.....Minneapolis
Bessesen, W. A.....Minneapolis
Beuning, J. B.....Albany
Bianco, A. J.....Duluth
Bicek, J. F.....St. Paul
Bigelow, C. E.....Dodge Center
Billings, R. E.....Franklin
Binet, H. E.....Grand Rapids
Binger, H. E.....St. Paul
Binger, M. W.....Rochester
Birnberg, T. L.....St. Paul
Black, William.....Mankato
Blacklock, S. S.....Hibbing
Blake, James.....Hopkins
Blakely, C. C.....Barnum
Blanchard, H. G.....Fairmont
Blaustone, H. H.....Minneapolis
Blegen, H. M.....Warren
Blumenthal, J. S.....Minneapolis
Boardman, D. V.....St. Cloud
Bock, R. A.....St. Paul
Bockman, M. W. H.....Minneapolis
Boeckmann, Egil.....St. Paul
Bofenkamp, F. W.....Luverne
Bohl, G. W.....Ada
Bohland, E. H.....St. Paul
Boies, L. R.....Minneapolis
Bole, R. S.....St. Paul
Boleyn, E. S.....Stillwater
Boman, P. G.....Duluth
Booth, A. E.....Minneapolis
Boothby, W. M.....Rochester
Boreen, C. A.....Minneapolis
Borg, J. F.....St. Paul
Borgeson, E. J.....Minneapolis
Borgerson, A. H.....Hewitt
Borreson, Baldwin.....Ah-Gwah-Ching
Bosland, H. G.....Verndale
Bossingham, O. N.....Lake Benton
Bottolfson, B. T.....Moorhead
Boudry, M. O.....Rochester
Bouma, L. R.....St. Paul
Bouman, H. A. H.....Minneapolis
Bowers, H. E.....Lake City
Bowers, J. T.....Thief River Falls
Bowing, H. H.....Rochester
Boyer, S. H.....Duluth
Boynton, Ruth.....Minneapolis
Boysen, H.....Welcome
Boysen, Peter.....Pelican Rapids
Braasch, W. F.....Rochester
Bracken, H. M.....Claremont, Calif.
Brand, G. D.....St. Paul
Brand, W. A.....Redwood Falls
Branham, D. S.....Albert Lea
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Bratrud, A. F.....Minneapolis
Bratrud, O. E.....Thief River Falls
Bratrude, E. J.....St. James
Brav, E. A.....Rochester
Braverman, N. J.....Duluth
Bray, C. W.....Biwabik
Bray, E. R.....St. Paul
Bregel, F. L.....St. James
Brekke, H. J.....Stillwater
Briggs, J. F.....St. Paul
Brigham, C. F.....St. Cloud
Brigham, Frank.....Watkins
Broders, A. C.....Rochester
Brodie, W. D.....St. Paul
Broker, W. S.....Battle Lake
Brooks, G. F.....Stillwater
Brown, A. E.....Rochester
Brown, A. H.....Pipestone
Brown, E. D.....Minneapolis
Brown, E. I.....St. Paul
Brown, E. J.....Minneapolis
Brown, G. E.....Rochester
Brown, J. C.....St. Paul
Brown, L. L.....Crookston
Brown, P. W.....Rochester
Brown, R. W.....Cambridge
Brownstone, Manuel.....Sandstone
Bruenner, Bertram.....Rochester
Brunsting, L. A.....Rochester
Brusegard, J. F.....Red Wing
Buck, F. H.....Shakopee
Buie, L. A.....Rochester
Bulkley, Kenneth.....Minneapolis
Bullard, Mattie J.....Minneapolis
Bullen, F. W.....Hibbing
Bumpus, H. C.....Rochester
Burch, F. E.....St. Paul
Burfiend, G. H.....St. Paul
Burnap, W. L.....Fergus Falls
Burns, F. W.....St. Paul
Burns, H. D.....Albert Lea
Burns, M. A.....Milan
Burns, R. L.....Two Harbors
Burns, R. M.....St. Paul
Burton, C. G.....St. Paul
Buscher, J. C.....St. Cloud
Busher, H.....St. Paul
Butler, John.....Minneapolis
Butsch, W. L.....Rochester
Butturff, C. R.....Freeborn
Butz, J. A.....Monterey
Butzer, J. A.....Mankato
Buzzelle, L. K.....Minneapolis

Cable, M. L.....Minneapolis
Cabot, C. M.....Rochester
Cabot, G. S.....Minneapolis
Cabot, Hugh.....Rochester
Cabot, V. S.....Minneapolis
Cady, L. H.....Minneapolis
Cain, E. F.....Rochester
Caine, C. E.....Morris
Caldwell, J. M., Jr.....Rochester
Caldwell, J. P.....St. Paul
Caldwell, K. S.....St. Paul
Calhoun, F. W.....Albert Lea
Callahan, F. F.....Pokegama
Callerstrom, G. W.....Minneapolis
Cameron, Isabell.....Minneapolis
*Cameron, J. A.....St. Paul
Camp, J. D.....Rochester
Camp, W. E.....Minneapolis
Campbell, J. E.....South St. Paul
Campbell, L. M.....Minneapolis
Campbell, O. J.....Minneapolis
Campbell, R. A.....Minneapolis
Canfield, W. W.....Houston
Cantwell, W. F.....International Falls
Cardle, A. E.....Minneapolis
Carlaw, C. M.....Minneapolis
Caron, R. P.....Minneapolis
Carroll, W. C.....St. Paul
Carstens, C. F.....Hibbing
Carter, F. G.....St. Paul
Castleton, K. B.....Rochester

*Deceased.

Catlin, J. J. ..... Buffalo
Cavanor, F. T. ..... Minneapolis
Cervenka, C. F. ..... New Prague
Chadbourn, A. G. ..... Heron Lake
Chapman, T. L. ..... Duluth
Cheney, E. L. ..... Duluth
Cherry, C. H. ..... Minneapolis
Chesley, A. J. ..... Minneapolis
Chatterton, C. C. ..... St. Paul
Christensen, E. P. ..... Two Harbors
Christensen, E. E. ..... Winona
Christenson, C. R. ..... Minneapolis
Christiansen, A. ..... St. Paul
Christianson, H. W. ..... Minneapolis
Christison, J. T. ..... St. Paul
Church, G. T. ..... Rochester
Cilley, E. I. L. ..... Rochester
Clark, A. L. ..... Rochester
Clark, H. S. ..... Minneapolis
Clark, T. C. ..... Minneapolis
Clay, F. H. ..... St. Charles
Claydon, D. R. ..... Red Wing
Claydon, H. F. ..... Zumbrota
Claydon, L. F. ..... Red Wing
Clement, Gage ..... Duluth
Clement, J. B. ..... Lester Prairie
Cochrane, W. J. ..... Lake City
Cohen, S. S. ..... Oak Terrace
Colby, Woodard ..... St. Paul
Cole, H. B. ..... Redwood Falls
Cole, W. H. ..... St. Paul
Coleman, F. B. ..... Austin
Collie, H. G. ..... St. Paul
Collins, A. N. ..... Duluth
Collins, D. C. ..... Rochester
Collins, H. C. ..... Duluth
Collins, J. S. ..... Wabasha
Colvin, A. R. ..... St. Paul
Combacker, L. C. ..... Fergus Falls
Comfort, M. W. ..... Rochester
Condit, W. H. ..... Minneapolis
Conner, H. M. ..... Rochester
Connor, C. E. ..... St. Paul
Cook, E. N. ..... Rochester
Cook, H. W. ..... Minneapolis
Cook, J. M. ..... Staples
Cook, N. C. ..... Rochester
Cooney, H. C. ..... Princeton
Cooperman, H. O. ..... Minneapolis
Corbett, J. F. ..... Minneapolis
Corniea, A. D. ..... Minneapolis
Corrigan, J. E. ..... Spooner
Cosgriff, J. A. ..... Bird Island
Cosman, E. O. ..... Minneapolis
Costello, R. T. ..... Rochester
Cottam, G. G. ..... Minneapolis
Counseller, V. S. ..... Rochester
Countryman, R. S. ..... St. Paul
Covell, W. W. ..... St. Peter
Coventry, W. A. ..... Duluth
Cowern, E. W. ..... North St. Paul
Crafts, L. M. ..... Minneapolis
Craig, W. McK. ..... Rochester
Cranmer, R. R. ..... Minneapolis
Cranston, R. W. ..... St. Louis Park
Cremer, M. H. ..... Red Wing
Cremer, P. H. ..... Hastings
Crenshaw, J. L. ..... Rochester
Cress, E. E. ..... Boyd
Cress, P. J. ..... Ellsworth
Crewe, J. E. ..... Rochester
Critchfield, L. R. ..... St. Paul
Cronwell, B. J. ..... Austin
Crow, E. R. ..... Arlington
Crump, J. W. ..... St. Paul
Culligan, J. M. ..... St. Paul
Culver, L. G. ..... Thief River Falls
Curry, F. S. ..... Rochester
Curtin, J. F. ..... Minneapolis
Cutts, George ..... Minneapolis

Dady, E. E. ..... Minneapolis
Dahl, E. O. ..... Minneapolis
Dahl, G. A. ..... Mankato
Dahl, J. A. ..... Minneapolis
Daignault, Oscar ..... Benson
Daniel, D. H. ..... Minneapolis
Daniel, L. M. ..... Minneapolis
Daniels, J. W. ..... St. Peter
Danielson, K. A. ..... Litchfield
Danielson, Lennox ..... Litchfield
Darling, J. B. ..... St. Paul
Darnall, C. M. ..... Rochester
Dart, L. O. ..... Minneapolis
Daugherty, E. B. ..... St. Paul
Daugherty, L. E. ..... St. Paul
Davis, A. C. ..... Rochester
Davis, B. F. ..... Duluth
Davis, F. U. ..... Faribault
Davis, Herbert ..... St. Paul
Davis, I. G. ..... Rushford
Davis, William ..... St. Paul
De Boer, Hermanus ..... Edgerton

Dedolph, Karl ..... St. Paul
Delmore, J. L. ..... Roseau
Demo, P. W. ..... Wells
Denman, A. V. ..... Mankato
Derauf, B. I. ..... St. Paul
Desjardins, A. U. ..... Rochester
Deuterman, J. L. ..... Rochester
Devereaux, T. J. ..... Wayzata
Dewey, D. H. ..... Owatonna
Dickson, T. H., Jr. ..... St. Paul
Diehl, H. S. ..... Minneapolis
Dierkes, G. J. ..... Rollingstone
Diessner, H. D. ..... Minneapolis
Dittman, G. C. ..... St. Paul
Dixon, C. F. ..... Rochester
Dolan, C. P. ..... Worthington
Dolder, F. C. ..... Eyota
Doms, H. C. ..... Slayton
Donaldson, C. A. ..... Mesa, Ariz.
Donohue, P. F. ..... St. Paul
Doolittle, L. E. ..... Duluth
Dordal, J. ..... Sacred Heart
Dorge, R. I. ..... Minneapolis
Dornblaser, H. B. ..... Minneapolis
Dorsey, G. C. ..... Minneapolis
Dovre, C. M. ..... St. Paul
Dowswell, W. J. ..... Kerkhoven
Doxey, G. I. ..... Minneapolis
Doyle, G. C. ..... Duluth
Doyle, L. O. ..... Minneapolis
Drake, C. B. ..... St. Paul
Drake, C. R. ..... Minneapolis
Drake, F. A. ..... Lanesboro
Dredge, H. P. ..... Hinckley
Dreisbach, Norman ..... Minneapolis
Drenckhahn, C. H. ..... Rochester
Drenning, F. C. ..... Duluth
Drill, H. E. ..... Hopkins
Drips, D. G. ..... Rochester
Drought, W. W. ..... Fergus Falls
Dubbe, F. H. ..... New Ulm
Du Bois, J. A. ..... Sauk Center
Du Bois, J. F. ..... Sauk Center
Duclos, J. A. ..... Henderson
Duff, E. R. ..... Minneapolis
Dugan, L. F. ..... Faribault
Dukelow, D. A. ..... St. Charles
Dulude, S. S. ..... Dassel
Dungay, N. S. ..... Northfield
Dunlap, E. H. ..... Minneapolis
Dunlap, H. F. ..... Passaic, N. J.
Dunlop, A. H. ..... Crookston
Dunlop, J. G., Jr. ..... Rochester
Dunn, G. R. ..... Minneapolis
Dunn, J. N. ..... St. Paul
Durgin, F. L. ..... Winnebago
Duryea, Marbry ..... Minneapolis
Dutton, C. E. ..... Minneapolis
Dwan, P. F. ..... Minneapolis
Dworsky, S. D. ..... Minneapolis
Dysterheft, A. F. ..... Gaylord

Earl, G. A. ..... St. Paul
Earl, R. O. ..... St. Paul
Eberlin, E. A. ..... Glenwood
Eby, C. B. ..... Spring Valley
Eckman, P. F. ..... Duluth
Eckstein, A. W. ..... Mankato
Edlund, G. ..... St. Paul
Edward, George ..... Canton
Edwards, G. C. ..... Grove City
Edwards, R. T. ..... Elysian
Ehrenberg, C. J. ..... Minneapolis
Ehrlich, S. P. ..... Minneapolis
Eich, Matthew ..... Minneapolis
Eisenstadt, D. H. ..... Minneapolis
Eitel, G. D. ..... Minneapolis
Ekblad, J. W. ..... Duluth
Eklund, E. J. ..... Norwood
Elias, F. J. ..... Duluth
Ellison, D. E. ..... Minneapolis
Ellison, F. E. ..... Monticello
Ely, O. S. ..... South St. Paul
Emanuel, K. W. ..... Duluth
Emerson, E. C. ..... St. Paul
Emmerson, W. S. ..... Mayer
Emmett, J. L. ..... Rochester
Emond, A. J. ..... Minneapolis
Endress, E. K. ..... St. Paul
Engberg, E. J. ..... St. Paul
Engstrand, O. J. ..... Minneapolis
Engstrom, F. A. ..... Wanamingo
Engstrom, G. F. ..... Belgrade
Eppard, R. M. ..... Cloquet
Erb, F. A. ..... Minneapolis
Erdman, C. A. ..... Minneapolis
Erickson, Eskil ..... Halstad
Erickson, R. F. ..... Minneapolis
Ericson, J. G. ..... Minneapolis
Ericson, R. M. ..... Minneapolis
Ericson, Swan ..... Le Sueur
Ernest, G. C. ..... South St. Paul
Eshelby, E. C. ..... St. Paul

Esser, John ..... Perham
Estrem, C. O. ..... Fergus Falls
Eusterman, G. B. ..... Rochester
Evans, E. T. ..... Minneapolis
Evans, R. D. ..... Minneapolis
Evans, V. L. ..... Rochester
Evarts, A. B. ..... Rochester
Ewing, C. F. ..... Wheaton
Exley, E. W. F. ..... Minneapolis

Fahey, E. W. ..... St. Paul
Fahr, G. F. ..... Minneapolis
Fansler, W. A. ..... Minneapolis
Farabaugh, C. L. ..... Owatonna
Fawcett, C. E. ..... Stewartville
Fellows, M. F. ..... Duluth
Feeney, J. M. ..... Minneapolis
Feldman, F. M. ..... Ah-Gwah-Ching
Fenger, E. P. K. ..... Oak Terrace
Ferguson, J. C. ..... St. Paul
*Ferreira, G. J. ..... Duluth
Fesler, H. H. ..... St. Paul
Fetterly, Warren ..... Minneapolis
Figi, F. A. ..... Rochester
Fiksdal, M. J. ..... Willmar
Fink, L. W. ..... Minneapolis
Fink, W. H. ..... Minneapolis
Fischer, H. P. ..... Shakopee
Fischer, M. McC. ..... Duluth
Fischer, P. M. ..... Shakopee
Fisher, J. M. ..... Proctor
Fitzgerald, D. F. ..... Minneapolis
Fitzgerald, E. T. ..... Morris
Fjeldstad, C. A. ..... Minneapolis
Flanagan, H. F. ..... St. Paul
Flanagan, L. G. ..... Austin
Flancher, L. H. ..... Lake Park
Fleischhauer, D. S. ..... Wabasha
Flinn, T. E. ..... Redwood Falls
Flom, A. O. ..... Chisago City
Fogarty, C. W. ..... St. Paul
Fogelberg, E. J. ..... St. Paul
Foley, F. E. B. ..... St. Paul
Folken, F. G. ..... Albert Lea
Folta, John ..... Ceylon
Foor, C. G. ..... Rochester
Forbes, R. S. ..... Duluth
Ford, B. C. ..... Marshall
Ford, W. H. ..... Minneapolis
Fortney, G. O. ..... Zumbrota
Foshager, H. T. ..... Clara City
Foster, R. F. ..... Rochester
Fowler, L. H. ..... Minneapolis
Franchere, F. W. ..... Lake Crystal
Francis, D. W. ..... Faribault
Fredericks, G. M. ..... Minneapolis
Fredrickson, Alice C. ..... Lake Lillian
Fredrickson, G. U. Y. ..... Lake Lillian
Freeman, C. D. ..... St. Paul
Freeman, G. H. ..... St. Peter
Freeman, J. P. ..... Albert Lea
Freeman, W. L. ..... St. Cloud
Freligh, W. P. ..... Albert Lea
Fricke, R. E. ..... Rochester
Friedell, Aaron ..... Minneapolis
Friesleben, William ..... Sauk Rapids
Frisch, F. P. ..... Willmar
Fritsche, Albert ..... New Ulm
Fritsche, C. J. ..... New Ulm
Froats, C. W. ..... Thief River Falls
Froehlich, H. W. ..... Minneapolis
Frost, E. H. ..... Willmar
Frost, R. H. ..... Wabasha
Fugina, G. R. ..... Mankato
Fulcher, O. H. ..... Rochester
Funk, V. K. ..... Oak Terrace

Gaarde, F. W. ..... Rochester
Gager, E. C. ..... St. Paul
Gaida, J. B. ..... Kilkenny
Gaines, E. C. ..... Buffalo Lake
Gallagher, B. J. ..... Waseca
Gamble, J. W. ..... Albert Lea
Gamble, P. M. ..... Albert Lea
Gamble, R. M. ..... Albert Lea
Gammell, J. H. ..... Minneapolis
Garbrecht, Arthur ..... St. Paul
Gardiner, D. G. ..... St. Paul
Gardner, E. L. ..... Minneapolis
Gardner, V. H. ..... Fairmont
Gardner, W. P. ..... St. Paul
Garlock, A. V. ..... Bemidji
Garlock, D. H. ..... Bemidji
Garvin, R. O. ..... Rochester
Gates, C. E. ..... Anoka
Geer, E. K. ..... St. Paul
Gehlen, J. N. ..... St. Paul
Geist, E. S. ..... Minneapolis
Geist, G. A. ..... St. Paul
Gelz, J. J. ..... St. Cloud
Gerber, M. P. ..... Brainerd
Germo, Charles ..... Balaton
Ghent, C. H. ..... St. Paul

*Deceased

Ghent, M. M. ..... St. Paul
Gbormley, R. K. ..... Rochester
Ghostley, Mary C. ..... Puposky
Gibbs, E. C. ..... St. Paul
Gibson, G. G. ..... Rochester
Giere, E. O. ..... Minneapolis
Giere, J. C. ..... Minneapolis
Giere, R. W. ..... Minneapolis
Giere, S. W. ..... Benson
Giesen, A. F. ..... Starbuck
Giessler, P. W. ..... Minneapolis
Giffin, H. Z. ..... Rochester
Gilfillan, J. S. ..... St. Paul
Gilles, F. L. ..... Minneapolis
Gillespie, J. B. ..... Rochester
Gillespie, M. G. ..... Duluth
Gillespie, N. H. ..... Duluth
Gilmore, Rowland ..... Bemidji
Gilpin, S. F., Jr. ..... Rochester
Ginsberg, Harry ..... Minneapolis
Ginsberg, William ..... St. Paul
Goblirsch, A. P. ..... Sleepy Eye
Goehrs, H. W. ..... St. Cloud
Golden, C. M. ..... Tyler
Goldish, D. R. ..... Duluth
Goltz, E. V. ..... St. Paul
Goodwin, T. W. ..... Rochester
Gowan, L. R. ..... Duluth
Graham, David ..... Duluth
Graham, R. D. ..... Duluth
Graham, Robert ..... Duluth
Graham, W. D. ..... Hanska
Grant, H. W. ..... St. Paul
Gratzek, F. R. ..... Minneapolis
Gratzek, Thomas ..... St. Paul
Grave, Floyd ..... Minneapolis
Graves, W. N. ..... Duluth
Grawn, F. A. ..... Northome
Gray, F. D. ..... Marshall
Gray, H. K. ..... Rochester
Green, E. K. ..... Minneapolis
Greene, H. H. ..... Austin
Greene, W. P. ..... Minneapolis
Grimes, A. V., Jr. ..... Rochester
Grimes, H. B. ..... Madelia
Grimes, Marian ..... Minneapolis
Grinnell, W. B. ..... Preston
Grise, W. B. ..... Austin
Groschupf, T. P. ..... Bemidji
Grose, F. N. ..... Clarissa
Gruenhagen, A. P. ..... St. Paul
Gullixson, A. ..... Albert Lea
Gully, R. J. ..... St. Peter
Gunderson, N. A. ..... Minneapolis
Gustafson, H. T. ..... Minneapolis

Habein, H. C. ..... Rochester
Haberman, E. ..... Osakis
Hacking, F. H. ..... Minneapolis
Haddow, N. W. ..... Minneapolis
Hagaman, G. K. ..... St. Paul
Hagen, G. L. ..... Minneapolis
Hagen, H. O. ..... New Richland
Hagen, O. E. ..... Butterfield
Hagen, O. J. ..... Moorhead
Haessly, S. B. ..... Faribault
Haggard, G. D. ..... Minneapolis
Haight, G. G. ..... Audubon
Haines, J. H. ..... Stillwater
Haines, S. F. ..... Rochester
Hale, D. E. ..... Rochester
Halgren, H. A. ..... Watertown
Hall, A. R. ..... St. Paul
Hall, H. H. ..... St. Paul
Hall, J. M. ..... Minneapolis
Hallberg, C. A. ..... Minneapolis
Hallenbeck, D. F. ..... Rochester
Halpin, J. E. ..... Rush City
Hamel, A. L. ..... Minneapolis
Hamilton, A. S. ..... Minneapolis
Hamlin, G. B. ..... Minneapolis
Hammermeister, T. F. ..... New Ulm
Hammes, E. M. ..... St. Paul
Hammond, A. J. ..... Minneapolis
Hammond, J. F. ..... St. Paul
Hand, W. R. ..... Elbow Lake
Haney, C. L. ..... Duluth
Hannah, H. B. ..... Minneapolis
Hanover, R. D. ..... Littlefork
Hansen, C. O. ..... Minneapolis
Hansen, E. W. ..... Minneapolis
Hansen, Olga S. ..... Minneapolis
Hanson, A. M. ..... Faribault
Hanson, E. C. ..... Park Rapids
Hanson, H. J. ..... Minneapolis
Hanson, H. V. ..... Minneapolis
Hanson, W. A. ..... Minneapolis
Happe, L. J. ..... Marshall
Hardgrove, M. A. F. ..... Rochester
Hare, E. R. ..... Minneapolis
Hargrave, R. L. ..... Rochester
Harmon, G. E. ..... St. Paul
Harper, F. R. ..... Rochester
Harriman, L. ..... Howard Lake
Harrington, C. D. ..... Minneapolis
Harrington, F. E. ..... Minneapolis
Harrington, S. W. ..... Rochester
Harris, C. N. ..... Hibbing
Hart, W. E. ..... Monticello
Hartfiel, W. F. ..... St. Paul
Hartley, E. C., Jr. ..... St. Paul
Hartman, H. R. ..... Rochester
Hartzell, T. B. ..... Minneapolis
Haskell, A. D. ..... Alexandria
Hassett, R. G. ..... Mankato
Hastings, D. R. ..... Minneapolis
Hatch, W. E. ..... Duluth
Hathaway, S. J. ..... Proctor
Hauge, M. I. ..... Clarkfield
Hauge, M. M. ..... Clarkfield
Hauser, V. P. ..... St. Paul
Havens, F. Z. ..... Rochester
Havens, J. G. W. ..... Austin
Haverfield, A. R. ..... Minneapolis
Hawkins, V. J. ..... St. Paul
Hawkinson, L. F. ..... Brainerd
Hawkinson, R. P. ..... Robbinsdale
Hayes, J. M. ..... Minneapolis
Hayes, M. F. ..... Nashwauk
Haynes, A. L. ..... Faribault
Head, D. P. ..... Minneapolis
Head, G. D. ..... Minneapolis
Healy, R. T. ..... Pierz
Hearn, W. O. ..... Minneapolis
Heath, A. C. ..... St. Paul
Hebeisen, M. B. ..... Chaska
Hebert, W. H. J. ..... Rochester
Heck, F. J. ..... Rochester
Heck, W. W. ..... St. Paul
Hedback, A. E. ..... Minneapolis
Hedberg, G. A. ..... Nopeming
Hedenstrom, F. G. ..... St. Paul
Hedenstrom, L. H. ..... Cambridge
Hedin, R. F. ..... Red Wing
Hegge, O. H. ..... Austin
Hegge, R. S. ..... Austin
Heiberg, E. A. ..... Fergus Falls
Heim, R. R. ..... Minneapolis
Heimark, J. H. ..... Moorhead
Heimark, J. J. ..... Fairmont
Heimark, O. E. ..... Duluth
Heise, W. F. C. ..... Winona
Helk, H. H. ..... Minneapolis
Helland, G. M. ..... Spring Grove
Helland, J. W. ..... Spring Grove
Helmholz, H. F. ..... Rochester
Hempstead, B. E. ..... Rochester
Hemstead, Werner ..... St. Cloud
Hench, P. S. ..... Rochester
Henderson, A. J. ..... Kiester
Henderson, M. S. ..... Rochester
Hendrickson, J. F. ..... Minneapolis
Hendrickson. R. R. ..... Wadena
Hengstler, W. H. ..... St. Paul
Henney, W. H. ..... McIntosh
Henry, C. E. ..... Minneapolis
Henry, M. O. ..... Minneapolis
Hengstler, W. H. ..... St. Paul
Henney, W. H. ..... McIntosh
Hensel, C. N. ..... St. Paul
Henslin, A. E. ..... Le Roy
Herbert, W. L. ..... Maynard
Herman, A. L. ..... Minneapolis
Hermanson. P. E. ..... Hendricks
Herrmann, E. T. ..... St. Paul
Hertel, G. E. ..... Austin
Hesdorffer, M. B. ..... Minneapolis
Heseltine, V. G. ..... Taylors Falls
Hesselgrave. S. S. ..... St. Paul
Hewitt, Edith S. ..... Rochester
Heyerdale, O. C. ..... Rochester
Hiebert, I. P. ..... Minneapolis
Higgins, J. H. ..... Minneapolis
Hilding, A. C. ..... Duluth
Hilger, A. W. ..... St. Paul
Hilger, D. D. ..... St. Paul
Hilger. L. A. ..... St. Paul
Hill, Eleanor J. ..... Minneapolis
Hines, E. A., Jr. ..... Rochester
Hirschboeck, F. J. ..... Duluth
Hirschfelder, A. D. ..... Minneapolis
Hirschfield. F. R. ..... Minneapolis
Hitchings, W. S. ..... Lakefield
Hoaglund, A. W. ..... Minneapolis
Hobbs. C. A. ..... Minneapolis
Hochfilzer. J. J. ..... St. Paul
Hodapp, R. J. ..... Willmar
Hodge, S. V. ..... Minneapolis
Hodgson, H. H. ..... Crookston
Hoerner, M. T. ..... Rochester
Hoff, Alfred ..... St. Paul
Hoffman, M. H. ..... St. Paul
Hoidale. A. D. ..... Tracy
Hoiland. A. S. ..... Minneapolis
Holbrook, I. S. ..... Mankato
Holcomb, J. T. ..... St. Paul
Holcomb, O. W. ..... St. Paul
Holl, P. M. ..... Minneapolis
Hollands, W. H. ..... Fisher
Holm, H. H. ..... Glencoe
Holm, P. F. ..... Wells
Holmberg, L. J. ..... Canby
Holmes, A. E. ..... Rush City
Holmstrom, C. H. ..... Warren
Holst, C. F. ..... Little Falls
Holst, J. B. ..... Little Falls
Holt, W. B. ..... Minneapolis
Holt, J. E. ..... St. Paul
Holtan, Theodore ..... Waterville
Holte, Halvor ..... Crookston
Horton, B. T. ..... Rochester
Hospodarsky, L. J. ..... New Prague
Hottinger, R. C. ..... Janesville
House, Z. E. ..... Cass Lake
Howard, Laura K. ..... Fergus Falls
Howard, M. I. ..... Mankato
Howard, W. H. ..... Minneapolis
Howard, W. S. ..... St. Paul
Howell, L. P. ..... Rochester
Howell, W. L. ..... Rochester
Hubbard, O. E. ..... Brainerd
Hubin, E. G. ..... Deerwood
Huenekens, E. J. ..... Minneapolis
Huffington, H. L. ..... Mankato
Hughes, L. D. ..... Minneapolis
Hultkrans, J. C. ..... St. Paul
Hultkrans, R. E. ..... Minneapolis
Humphrey, E. W. ..... Moorhead
Humphrey, W. R. ..... Stillwater
Hunt, F. N. ..... Fairmont
Hunt, R. C. ..... Fairmont
Hurd, Annah ..... Minneapolis
Husband, M. W. ..... Minneapolis
Huseby, H. W. ..... Floodwood
Hutchinson, Henry ..... New London
Huxley, F. R. ..... Faribault
Hyde, T. L. ..... Rochester
Hynes, J. E. ..... Minneapolis

Iber, F. C. ..... Rochester
Ide, A. W. ..... St. Paul
Ikeda, Kano ..... St. Paul
Imes, P. R. ..... Rochester
Irwin, A. F. ..... Minneapolis

Jackson, C. M. ..... Minneapolis
Jacobs, A. C. ..... Elmore
Jacobs, G. C. ..... Fergus Falls
Jacobs, J. C. ..... Willmar
Jacobson, Clarence ..... Chisholm
Jacobson, D. J. ..... Blackduck
Jacquot, G. L. ..... Marshall
Jamieson, Earl ..... Walnut Grove
Jennings, F. L. ..... Oak Terrace
Jennings, Mary H. ..... Minneapolis
Jensen, A. H. ..... Hutchinson
Jensen, H. H. ..... Atwater
Jensen, Harry ..... Minneapolis
Jensen, M. J. ..... Minneapolis
Jensen, T. J. ..... Duluth
Johnson, A. B. ..... Minneapolis
Johnson, A. E. ..... Minneapolis
Johnson, A. E. ..... Red Wing
Johnson, A. M. ..... St. Paul
Johnson, C. E. ..... Cambridge
Johnson, C. M. ..... Dawson
Johnson, E. W. ..... Bemidji
Johnson, Ellsworth ..... Rochester
Johnson, H. C. ..... St. Paul
Johnson, H. M. ..... Dawson
Johnson, H. P. ..... Fairmont
Johnson, Hans ..... Kerkhoven
Johnson, J. A. ..... Minneapolis
Johnson, J. A. ..... St. Paul
Johnson, Julius ..... Minneapolis
Johnson, N. A. ..... Minneapolis
Johnson, Norman ..... Minneapolis
Johnson, O. H. ..... Redwood Falls
Johnson, O. V. ..... Fergus Falls
Johnson, R. A. ..... Minneapolis
Johnson, R. B. ..... Lanesboro
Johnson, R. G. ..... St. Paul
Johnson, S. M. ..... Minneapolis
Johnson, Spencer ..... Rochester
Johnson, T. H. ..... St. Paul
Johnson, V. P. ..... Delano
Johnson, W. E. ..... Morgan
Johnson, W. R. ..... Rochester
Johnson, Walfred ..... Sauk Center
Johnson, Y. T. ..... Minneapolis
Johnston, H. H. ..... Rochester
Jolin, F. B. ..... Coleraine
Jones, A. W. ..... Red Wing
Jones, D. C. ..... St. Paul
Jones, E. M. ..... St. Paul
Jones, G. M. ..... Minneapolis
Jones, H. W. ..... Minneapolis
Jones, R. N. ..... St. Cloud

Jones, W. R. ..... Minneapolis
Jordan, L. S. ..... Granite Falls
Josewich, Alexander ..... Minneapolis
Josewski, R. J. ..... Stillwater
Joyce, G. L. ..... Stewartville
Joyce, G. T. ..... Rochester
Judd, E. S. ..... Rochester
Juergens, H. M. ..... Belle Plaine
Juers, E. H. ..... Red Wing
Just, H. J. ..... Lafayette

Kaasa, L. J. ..... Albert Lea
Kadesky, David ..... St. Paul
Kahala, Arthur ..... Pasadena, Calif.
Kalinoff, D. ..... Stillwater
Kamman, G. R. ..... St. Paul
Kamp, B. A. ..... Albert Lea
Kannary, E. L. ..... St. Paul
Kanne, C. W. ..... Faribault
Karn, B. R. ..... Ortonville
Kasper, E. M. ..... St. Paul
Kaufman, W. C. ..... Appleton
Kegaries, D. L. ..... Rochester
Keith, N. M. ..... Rochester
Kelby, G. M. ..... Minneapolis
Kelling, L. F. ..... Lakefield
Kelly, B. W. ..... Aitkin
Kelly, J. V. ..... St. Paul
Kelly, P. H. ..... St. Paul
Kelsey, C. G. ..... Hinckley
Kemp, M. W. ..... Fergus Falls
Kendahl, A. M. ..... Jasper
Kenefick, E. V. ..... St. Paul
Kennedy, C. C. ..... Minneapolis
Kennedy, F. S. ..... Rochester
Kennedy, Jane F. ..... Minneapolis
Kennedy, R. L. J. ..... Rochester
Kennedy, R. R. ..... Minneapolis
Kennedy, W. A. ..... St. Paul
Kepler, E. J. ..... Rochester
Kerlan, S. Z. ..... Aitkin
Kernohan, J. W. ..... Rochester
Kerschbaumer, Louisa ..... St. Peter
Kertesz, G. ..... Minneapolis
Kesting, Herman ..... St. Paul
Keyes, C. R. ..... Duluth
Keyes, E. D. ..... Winona
Keyes, H. C. ..... Rochester
Keyes, J. D. ..... Winona
Kibbe, O. A. ..... Minneapolis
Kierland, P. E. ..... Alexandria
Kiesling, I. H. ..... Nashwauk
Kilbourne, A. F. ..... Rochester
Kilbride, E. A. ..... Worthington
Kilbride, J. S. ..... Canby
King, E. A. ..... Minneapolis
King, G. L. ..... St. Paul
King, H. T. ..... Minneapolis
King, W. R. ..... Minneapolis
King, Z. P. ..... St. Paul
Kingsbury, E. M. ..... Clearwater
Kinsella, T. J. ..... Oak Terrace
Kirch, W. A. W. ..... Rochester
Kirk, G. P. ..... East Grand Forks
Kirklin, B. R. ..... Rochester
Kirklin, O. L. ..... Rochester
Kistler, A. J. ..... Minneapolis
Kistler, C. M. ..... Minneapolis
Klaveness, E. ..... St. Paul
Klein, H. N. ..... St. Paul
Klein, Harry ..... Duluth
Klima, W. W. ..... Stewart
Kliman, F. E. ..... Duluth
Knapp, F. N. ..... Duluth
Knauff, M. K. ..... St. Paul
Knight, R. R. ..... Minneapolis
Knight, R. T. ..... Minneapolis
Koch, J. C. ..... Minneapolis
Koelsche, G. A. ..... Rochester
Koenigsberger, Charles ..... Mankato
Koepcke, G. M. ..... Minneapolis
Kohlbry, C. O. ..... Duluth
Kohler, D. W. ..... St. Joseph
Koller, H. M. ..... Minneapolis
Koller, L. R. ..... Minneapolis
Kolset, C. D. ..... Sanborn
Kooiker, H. J. ..... Milaca
Koop, S. H. ..... Richmond
Kotchevar, F. R. ..... Eveleth
Kraft, Peter ..... Duluth
Kreuzer, T. C. ..... Owatonna
Kucera, F. J. ..... Hopkins
Kucera, W. J. ..... Minneapolis
Kuhlmann, August ..... Melrose
Kuske, A. W. ..... Faribault
Kusske, A. L. ..... New Ulm
Kuth, J. R. ..... Duluth
Kvitrud, G. ..... St. Paul

Lagersen, R. W. ..... Minneapolis
Laird, A. T. ..... Nopeming
Lajoie, J. M. ..... Minneapolis
Lamb, H. L. ..... Little Falls
Lamont, J. G. ..... Nopeming
Lane, Laura A. ..... Northfield
Langenderfer, F. V. ..... St. Paul
Langhoff, A. H. ..... Glencoe
Lannin, J. C. ..... Mabel
Lansbury, John ..... Rochester
Lapierre, A. P. ..... Minneapolis
Lapierre, C. A. ..... Minneapolis
Lapierre, J. T. ..... Minneapolis
Larsen, C. L. ..... St. Paul
Larsen, O. O. ..... Detroit Lakes
Larson, A. L. ..... Detroit Lakes
Larson, C. M. ..... Minneapolis
Larson, J. T. ..... Lake Wilson
Larson, L. M. ..... Minneapolis
Larson, L. M. ..... Oak Terrace
Larson, P. N. ..... Rochester
Laughlin, J. T. ..... Grey Eagle
Laurent, A. A. ..... Minneapolis
La Vake, R. T. ..... Minneapolis
Lax, M. H. ..... St. Paul
Lazar, H. L. ..... Minneapolis
Leahy, Bartholomew ..... St. Paul
Leavenworth, R. O. ..... St. Paul
Lebowske, J. A. ..... Minneapolis
Leck, P. C. ..... Austin
Leckband, Norbert ..... Buhl
Leddy, E. T. ..... Rochester
Lee, H. M. ..... Minneapolis
Lee, J. L. ..... Watertown
Lee, W. A. ..... Fergus Falls
Lee, W. N. ..... Madison
Leibold, H. H. ..... Parkers Prairie
Leitch, Archibald ..... St. Paul
Leitch, N. M. ..... Warroad
Leland, H. R. ..... Minneapolis
Leland, M. N. ..... Minneapolis
Lemon, W. S. ..... Rochester
Lende, Norman ..... Faribault
Lendrum, F. C. ..... Rochester
Lenont, C. B. ..... Virginia
Leonard, G. J. ..... St. Paul
Leonard, L. J. ..... Minneapolis
Lepak, F. J. ..... Duluth
Lepak, J. A. ..... St. Paul
Leopard, B. A. ..... Albert Lea
Lerche, William ..... Cable, Wis.
Lester, G. L. ..... Rochester
Levin, Bert ..... St. Paul
Lewis, A. J. ..... Henning
Lewis, C. B. ..... St. Cloud
Lewis, W. W. ..... St. Paul
Lexa, F. J. ..... Lonsdale
Libert, J. N. ..... St. Cloud
Lichtenstein, H. ..... Winona
Lick, C. L. ..... St. Paul
Liedloff, A. G. ..... Mankato
Liffrig, W. W. ..... Goodhue
Lightbourn, E. T. ..... Jordan
Lillehei, E. J. ..... Robbinsdale
Lillie, H. I. ..... Rochester
Lillie, W. I. ..... Rochester
Lima, Ludvig ..... Montevideo
Lind, C. J. ..... Minneapolis
Lindahl, M. J. ..... Winthrop
Lindberg, A. L. ..... Wheaton
Lindquist, R. H. ..... Minneapolis
Linner, H. P. ..... Minneapolis
Linton, W. B. ..... Minneapolis
Lippman, H. S. ..... St. Paul
Lippmann, E. W. ..... Hutchinson
Litman, A. B. ..... Minneapolis
Litman, S. N. ..... Duluth
Little, W. J. ..... St. Paul
Litzenberg, J. C. ..... Minneapolis
Lloyd, H. J. ..... Mankato
Lochead, D. C. ..... Rochester
Locken, O. E. ..... Crookston
Loenholdt, E. H. ..... Hector
Logan, A. M. ..... Rochester
Logefeil, R. C. ..... Minneapolis
Lommen, P. A. ..... Austin
Loney, W. R. R. ..... Rochester
Long, Jesse ..... Minneapolis
Loofbourrow, E. H. ..... Keewatin
Loomis, E. A. ..... Minneapolis
Love, F. A. ..... Carlos
Love, J. G. ..... Rochester
Lowe, E. R. ..... South St. Paul
Lowe, T. A. ..... South St. Paul
Luden, Georgine ..... Victoria, B. C., Can.
Luedtke, G. H. ..... Fairmont
Lum, C. E. ..... Duluth
Lund, W. J. ..... Staples
Lundgren, A. C. ..... Minneapolis
Lundholm, A. M. ..... St. Paul
Lundquist, E. F. ..... Minneapolis
Lundy, J. S. ..... Rochester
Lymburner, R. M. ..... Rochester
Lynch, M. J. ..... Minneapolis
Lynde, O. G. ..... Thief River Falls
Lyon, E. P. ..... Minneapolis
Lysne, Henry ..... Minneapolis
MacDonald, A. E. ..... Minneapolis
MacDonald, D. A. ..... Minneapolis
MacDonald, I. C. ..... Minneapolis
MacFarlane, P. H. ..... Chisholm
Mach, F. B. ..... Minneapolis
Macklin, W. E., Jr. ..... Litchfield
Macnie, J. S. ..... Minneapolis
MacRae, G. C. ..... Duluth
Macy, J. W. ..... Rochester
Madden, J. F. ..... St. Paul
Madland, R. S. ..... Fairfax
Maertz, W. F. ..... New Prague
Magath, T. B. ..... Rochester
Magee, H. R. ..... Rochester
Magney, F. H. ..... Duluth
Mahowald, A. ..... Albany
Maland, C. O. ..... Minneapolis
Malerich, J. A. ..... Caledonia
Manley, J. R. ..... Duluth
Mann, A. T. ..... Minneapolis
Mann, F. C. ..... Rochester
Marble, W. P. ..... Rochester
Marcum, E. H. ..... Bemidji
Mariette, E. S. ..... Oak Terrace
Mark, D. B. ..... Minneapolis
Mark, Hilbert ..... Ah-Gwah-Ching
Martin, E. T. ..... Duluth
Martin, T. P. ..... Arlington
Martin, W. C. ..... Duluth
Martineau, J. L. ..... St. Paul
Massey, B. D. ..... Rochester
Masson, D. M. ..... Rochester
Masson, J. C. ..... Rochester
Matchan, G. R. ..... Minneapolis
Matthews, Justus ..... Minneapolis
Mattill, P. M. ..... Oak Terrace
Mattison, P. A. ..... Winona
Mattson, C. H. ..... St. Paul
Mattson, Hamlin ..... Minneapolis
Maxeiner, S. R. ..... Minneapolis
May, W. H. ..... Minneapolis
Mayland, M. L. ..... Faribault
Mayne, R. M. ..... Duluth
Mayo, C. H. ..... Rochester
Mayo, C. W. ..... Rochester
Mayo, J. G. ..... Rochester
Mayo, W. J. ..... Rochester
Maytum, C. K. ..... Rochester
McBeath, E. C. ..... New York, N. Y.
McBroom, D. E. ..... Cambridge
McCarthy, Donald ..... Minneapolis
McCarthy, W. J. ..... Madelia
McCarthy, W. R. ..... St. Paul
McCarty, P. D. ..... Ely
McCarty, W. C. ..... Rochester
McCloud, C. N. ..... St. Paul
McComb, C. F. ..... Duluth
McCoy, Mary K. ..... Duluth
McCrea, J. M. ..... Fulda
McCuskey, C. F. ..... Rochester
McDaniel, Orianna ..... Minneapolis
McDonald, A. L. ..... Duluth
McDowell, J. P. ..... St. Cloud
McEachran, A. ..... Minneapolis
McEnaney, C. T. ..... Owatonna
McFarland, A. H. ..... Minneapolis
McGandy, R. F. ..... Minneapolis
McGeary, G. E. ..... Minneapolis
McGroarity, J. J. ..... Easton
McGuigan, H. T. ..... Red Wing
McHaffie, O. L. ..... Duluth
McHugh, R. F. ..... Aitkin
McInerney, Maurice ..... Minneapolis
McIntire, H. M. ..... Waseca
McIntyre, George ..... Minneapolis
McIntyre, J. A. ..... Owatonna
McKaig, C. B. ..... Pine Island
McKenna, J. K. ..... Austin
McKeon, J. O. ..... Montgomery
McKeon, James ..... St. Paul
McKeon, Owen ..... St. Paul
McKeown, E. G. ..... Pipestone
McKinlay, C. A. ..... Minneapolis
McKinley, J. C. ..... Minneapolis
McKinney, F. S. ..... Minneapolis
McLane, Evelyn G. ..... Sleepy Eye
McLane, W. O. ..... Sleepy Eye
McLaren, Jennette M. ..... St. Paul
McLaughlin, E. M. ..... Winona
McMahon, M. J. ..... Green Isle
McNevin, C. F. ..... St. Paul
McNutt, J. R. ..... Duluth
McPheeters, H. O. ..... Minneapolis
McQuiston, J. S. ..... Rochester
McRoberts, J. W. ..... Rochester
Meade, J. R. ..... Rochester
Meckstroth, C. W. ..... Brandon
Meierding, W. A. ..... New Ulm
Meinert, A. E. ..... Winona
Meland, E. L. ..... Minneapolis
Melby, Benedik ..... Blooming Prairie
Mellby, O. F. ..... Thief River Falls

Melzer, G. R.....Lyle
Mercil, W. F.....Crookston
Merkert, C. E.....Minneapolis
Merkert, G. L.....Minneapolis
Merriman, L. L.....Duluth
Mesker, G. H.....Olivia
Meyer, A. A.....Melrose
Meyer, E. L.....Minneapolis
Meyer, P. F.....Faribault
Meyerding, E. A.....St. Paul
Meyerding, H. W.....Rochester
Michael, J. C.....Minneapolis
Michelson, H. E.....Minneapolis
Miller, F. J.....Red Wing
Miller, H. A.....Fairmont
Miller, V. I.....Mankato
Miller, W. A.....New York Mills
Millet, R. F.....Rochester
Mills, J. L.....Winnebago
Mills, S. D.....Rochester
Milton, J. S.....Minneapolis
Miners, G. A.....Deer River
Mitchell, R. S.....Grand Meadow
Moe, R. J.....Duluth
Moen, J. K., Jr.....Minneapolis
Moersch, F. P.....Rochester
Moersch, H. J.....Rochester
Moga, J. A.....St. Paul
Mogilner, S. N.....St. Paul
Mohardt, J. H.....Rochester
Moir, W. W.....Minneapolis
Molander, H. A.....St. Paul
Monroe, P. B.....Two Harbors
Montgomery, Hamilton.....Rochester
Montgomery, Jimmie Ethel.....Rochester
Mooney, L. P.....Marble
Moorhead, M. B.....Minneapolis
Moquin, Marie A.....St. Paul
Moran, T. R.....St. Paul
More, C. W.....Eveleth
Morehead, D. E.....Owatonna
Morey, J. B.....Rochester
Moriarty, Cecile R.....Minneapolis
Mork, B. O.....Worthington
Mork, B. O., Jr.....Worthington
Morley, G. A.....Crookston
Morrison, A. W.....Minneapolis
Morrissey, F. B.....St. Paul
Morse, M. P.....LeRoy
Morse, R. W.....Minneapolis
Morss, C. R.....Zumbrota
Mortenson, N. G.....St. Paul
Morton, H. McI.....Minneapolis
Mosby, M. E.....Browerville
Moses, Joseph, Jr.....Northfield
Moss, M. N.....St. Paul
Moyer, R. E.....Bemidji
Moynihan, A. F.....Sauk Center
Moynihan, T. J.....St. Paul
Mueller, S. C.....Rochester
Muller, R. T.....St. Paul
Murdoch, J. M.....Faribault
Murphy, I. J.....Minneapolis
Murphy, Leo.....Minneapolis
Murray, S. E.....Rochester
Mussey, R. D.....Rochester
Myers, J. A.....Minneapolis
Myers, Thomas.....St. Paul

Naegeli, A. E.....St. Paul
Naegeli, Frank.....Fergus Falls
Nagel, H. D.....Waconia
Nass, H. A.....Mabel
Nathanson, M. H.....Minneapolis
Nauth, W. W.....Winona
Neher, F. H.....St. Paul
Nehring, J. P.....Preston
Neilson, H. F.....Minneapolis
Nelson, C. P.....Owatonna
Nelson, E. H.....Chisholm
Nelson, E. J.....Owatonna
Nelson, H. E.....Crookston
Nelson, H. S.....Minneapolis
Nelson, Harvey.....Minneapolis
Nelson, L. A.....St. Paul
Nelson, M. S.....Granite Falls
Nelson, N. P.....Brainerd
Nelson, O. E.....Minneapolis
Nelson, O. N.....Battle Lake
Nelson, R. L.....Duluth
Nelson, W. I.....Underwood
Nethercott, E. G.....Pine City
Neumann, C. A.....Winona
New, G. B.....Rochester
Newell, C. E.....Rochester
Newhart, Horace.....Minneapolis
Nicholson, M. A.....Duluth
Nickerson, W. S.....Faribault
Ninneman, N. N.....Silver Lake
Nippert, H. T.....St. Paul
Noble, J. F.....St. Paul
Nordin, C. G.....St. Paul
Nordin, G. T.....Minneapolis
Nordland, Martin.....Minneapolis
Nordman, W. F.....Mora
Norman, J. F.....Crookston
Noth, H. W.....Minneapolis
Novak, E. E.....New Prague
Nye, Katherine A.....St. Paul
Nye, Lillian L.....St. Paul
Nystrom, Ruth.....Minneapolis

Oberg, C. M.....Minneapolis
O'Brien, W. A.....Minneapolis
O'Connor, D. C.....Eden Valley
O'Connor, L. J.....St. Paul
O'Donnell, J. E.....Minneapolis
Oeljen, S. C. G.....Waseca
Oerting, Harry.....St. Paul
Ogden, Warner.....St. Paul
Ohage, Justus.....St. Paul
Ohage, Justus, Jr.....St. Paul
Ohlinger, L. B.....Chicago
O'Leary, P. A.....Rochester
Olson, A. E.....Duluth
Olson, Archibald.....Hendricks
Olson, C. A.....St. Paul
Olson, C. J.....Belle Plaine
Olson, E. A.....Pine Island
Olson, F. A.....Minneapolis
Olson, J. W.....Cokato
Olson, O. A.....Minneapolis
Olson, P. F.....Rochester
Olson, R. G.....Minneapolis
Olson, W. P.....Gaylord
Onsgard, L. K.....Houston
Onsgard, L. K., Jr.....Houston
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston
Oppen, E. G.....Minneapolis
O'Reilley, B. E.....St. Paul
Ormond, Douglas.....Waconia
Osborn, Lida.....Mankato
Ostergren, E. W.....St. Paul
Overend, K. V.....Hallock
Overton, L. M.....Rochester
Owre, Oscar.....Minneapolis

Pace, J. M.....Rochester
Page, C. V.....St. Paul
Page, R. L.....St. Charles
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Paradis, W. G.....Crookston
Parker, H. L.....Rochester
Parker, O. W.....Ely
Parkhill, Edith M.....Rochester
Parks, A. H.....Minneapolis
Parson, L. R.....Elbow Lake
Parsons, J. G.....Crookston
Passer, A. A.....Olivia
Pattee, G. L.....Rochester
Patterson, W. E.....Minneapolis
Patterson, W. E.....Westbrook
Paulsen, E. L.....Minneapolis
Paulson, T. S.....Fergus Falls
Pearce, N. O.....Minneapolis
Pearson, F. R.....St. Paul
Pearson, W. T.....Finlayson
Pedersen, A. H.....St. Paul
Pederson, Harold.....Minneapolis
Pederson, R. M.....Minneapolis
Pemberton, J. de J.....Rochester
Penhall, F. W.....Morton
Pennie, D. F.....Duluth
Peppard, T. A.....Minneapolis
Perry, C. G.....St. Paul
Perry, R. St. J.....Minneapolis
Persons, C. E.....Marshall
Pertl, A. L.....Windom
Petersen, J. R.....Minneapolis
Petersen, M. C.....St. Peter
Petersen, Thorvald.....Minneapolis
Peterson, A. A.....Mora
Peterson, E. N.....Eveleth
Peterson, H. W.....Minneapolis
Peterson, O. H.....Minneapolis
Peterson, O. L.....Cokato
Peterson, R. A.....Vesta
Peterson, V. N.....St. Paul
Peterson, V. L.....Rochester
Peterson, W. C.....Minneapolis
Petit, L. J.....Minneapolis
Pettit, C. W.....Minneapolis
Pfunder, M. C.....Minneapolis
Phelps, A. G.....St. Paul
Phelps, K. A.....Minneapolis
Phillips, J. R.....Rochester
Phillips, W. H.....Jordan
Piper, M. C.....Rochester
Piper, W. A.....Mountain Lake
Platou, E. S.....Minneapolis
Plondke, F. J.....St. Paul
Plonske, C. J.....Faribault
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Poirier, J. A.....Forest Lake
Pollard, D. W.....Minneapolis
Pollock, D. K.....Minneapolis
Pollock, L. W.....Rochester
Polzak, J. A.....Minneapolis
Popp, W. C.....Rochester
Poppe, F. H.....Minneapolis
Portmann, W. C.....Jackson
Power, J. E.....Duluth
Prangen, A. D.....Rochester
Pratt, F. J.....Minneapolis
Pratt, J. A.....Minneapolis
Preine, I. A.....Minneapolis
Prendergast, H. J.....St. Paul
Prickman, J. E.....Rochester
Priestley, J. T.....Rochester
Prim, J. A.....Minneapolis
Proshek, C. E.....Minneapolis
Purvis, G. H.....Russell

Quade, R. H.....Rochester
Quanstrom, V. E.....Brainerd
Quinby, T. F.....Minneapolis
Quist, H. W.....Minneapolis

Raadquist, C. S.....Montevideo
Raaf, J. E.....Rochester
Radabaugh, R. C.....Hastings
Raiter, F. W. S.....Cloquet
Raiter, R. F.....Cloquet
Ramsey, W. R.....St. Paul
Randall, L. M.....Rochester
Ransom, M. L.....Hancock
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Rebman, E. C.....Austin
Reff, A. R.....Crookston
Regnier, E. A.....Minneapolis
Reineke, G. F.....New Ulm
Reiter, H. W.....Shakopee
Reynolds, J. S.....Minneapolis
Rice, C. O.....Minneapolis
Richards, E. T. F.....St. Paul
Richards, W. B.....St. Cloud
Richardson, H. E.....St. Paul
Richardson, W. J.....Fairmont
Richdorf, L. F.....Minneapolis
Ridgway, A. M.....Annandale
Ridgway, Alexander.....South Haven
Ridgway, Florence.....Minneapolis
Rigler, L. G.....Minneapolis
Ringle, O. F.....Walker
Rishmiller, J. H.....Minneapolis
Risser, E. D.....Winona
Ritchie, H. P.....St. Paul
Rivers, A. B.....Rochester
Rixford, E. L.....Rochester
Rizer, R. I.....Minneapolis
Roan, C. M.....Minneapolis
Robb, E. F.....Minneapolis
Robbins, C. P.....Winona
Roberts, L. M.....Little Falls
Roberts, O. W.....Owatonna
Roberts, T. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robertson, H. E.....Rochester
Robertson, J. B.....Cottonwood
Robertson, P. A.....Austin
Robilliard, C. M.....Faribault
Robins, C. R., Jr.....Rochester
Robinson, J. M.....Duluth
Robinson, L. W.....Rochester
Robitshek, E. C.....Minneapolis
Rochford, W. E.....Minneapolis
Rodda, F. C.....Minneapolis
Rodgers, C. L.....Minneapolis
Roehlke, A. B.....Elk River
Rogers, J. T.....St. Paul
Rogin, J. R.....Rochester
Roholt, C. L.....Waverly
Rohrer, C. A.....Waterville
Rood, D. C.....Duluth
Rose, J. T.....Lakefield
Rosen, Samuel.....Minneapolis
Rosenberger, H. P.....St. Paul
Rosenholtz, Burton.....St. Paul
Rosenow, E. C.....Rochester
Rosenthal, Robert.....St. Paul
Rosenwald, R. M.....Minneapolis
Rothenburg, J. C.....Springfield
Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Rouse, J. J.....Nopeming
Rousseau, Victor.....Maple Lake
Roust, H. A.....Montevideo
Rowe, O. W.....Duluth
Roy, J. A.....Red Lake Falls
Roy, Philemon.....St. Paul
Rucker, C. W.....Minneapolis
Rucker, W. H.....Minneapolis
Rud, N. E.....Minneapolis

Rudell, G. L. ..... Minneapolis
Rudie, C. N. ..... Kenyon
Rudie, P. S. ..... Duluth
Rudolph, E. A. ..... Rochester
Ruggles, G. McC. ..... Stillwater
Ruhberg, G. N. ..... St. Paul
Rumpf, C. W. ..... Faribault
Rumpf, W. H. ..... Faribault
Russ, H. H. ..... Blue Earth
Russeth, A. N. ..... Minneapolis
Rutherford, W. C. ..... St. Paul
Rutledge, L. H. ..... Detroit Lakes
Ryan, J. J. ..... St. Paul
Ryan, J. M. ..... St. Paul
Ryan, M. E. ..... St. Paul
Ryan, W. J. ..... Duluth
Rydburg, W. C. ..... Brooten
Rynearson, E. H. ..... Rochester

Saffert, C. A. ..... New Ulm
Sahr, W. G. ..... Hutchinson
Saliterman, B. I. ..... Minneapolis
Salt, C. G. ..... Minneapolis
Samson, E. R. ..... Chisholm
Samuelson, L. G. ..... Mankato
Sanderson, E. T. ..... Minneota
Sanford, A. H. ..... Rochester
Sarff, O. E. ..... Buhl
Satersmoen, Theo. ..... Pelican Rapids
Sather, E. R. ..... Alexandria
Satterlee, H. W. ..... Lewiston
Satterlund, V. L. ..... St. Paul
Savage, F. J. ..... St. Paul
Sawatzy, W. A. ..... Minneapolis
Schaaf, F. H. K. ..... Minneapolis
Schaefer, J. F. ..... Owatonna
Schaefer, S. ..... Winona
Schaefer, W. G. ..... Minneapolis
Schatz, F. J. ..... St. Cloud
Scheldrup, N. H. ..... Minneapolis
Scherer, R. G. ..... Rochester
Schimelpfenig, G. T. ..... Chaska
Schlesselman, J. T. ..... Mankato
Schmitt, A. F. ..... Minneapolis
Schmitt, S. C. ..... Minneapolis
Schneider, H. A. ..... Jordan
Schneider, J. P. ..... Minneapolis
Schoch, J. L. ..... New Ulm
Schoch, R. B. ..... St. Paul
Scholpp, O. W. ..... Hutchinson
Schons, Edward ..... St. Paul
Schoofs, G. E. ..... North Branch
Schroder, C. H. ..... Duluth
Schuldt, F. C. ..... St. Paul
Schultz, J. A. ..... Albert Lea
Schulze, A. G. ..... St. Paul
Schutz, E. S. ..... Mountain Lake
Schussler, O. F. ..... Minneapolis
Schwartz, V. J. ..... Minneapolis
Schwyzer, Arnold ..... St. Paul
Schwyzer, Gustav ..... Minneapolis
Schwyzer, Robert ..... Minneapolis
Scofield, C. L. ..... Benson
Scott, E. E. ..... St. Paul
Scott, F. H. ..... Minneapolis
Seashore, D. E. ..... Duluth
Seashore, Gilbert ..... Minneapolis
Seeley, I. F. ..... Northfield
Seham, Max ..... Minneapolis
Seifert, O. J. ..... New Ulm
Selleseth, I. F. ..... Minneapolis
Senkler, G. E. ..... St. Paul
Senn, E. W. ..... Owatonna
Serkland, J. C. ..... Rothsay
Setzer, H. J. ..... St. Paul
Shannon, S. S. ..... Crosby
Shannon, W. R. ..... St. Paul
Shapiro, E. Z. ..... Duluth
Shapiro, M. J. ..... Minneapolis
Shastid, T. H. ..... Duluth
Shedlov, A. ..... Fosston
Sheldon, W. D. ..... Rochester
Shelland, J. T. ..... Ada
Shellman, J. L. ..... St. Paul
Sheppard, Fred ..... Hutchinson
Sheppard, P. E. ..... Hutchinson
Sherman, C. L. ..... Luverne
Sherman, H. T. ..... Grand Meadow
Sherwood, G. E. ..... Kimball
Shillington, M. A. ..... St. Paul
Short, Jacob ..... St. Paul
Shrader, J. S. ..... Wheaton
Simison, C. W. ..... Hawley
Simon, B. F. ..... St. Paul
Simons, B. H. ..... Chaska
Simons, E. J. ..... Swanville
Simons, Jalmar ..... Minneapolis
Simons, L. T. ..... Shakopee
Simpson, E. D. ..... Minneapolis
Sinamark, Andrew ..... Hibbing
Singer, B. J. ..... St. Paul
Siperstein, D. M. ..... Minneapolis
Sitar, R. F. ..... Minneapolis
Sivertsen, Ivar ..... Minneapolis
Skinner, H. O. ..... St. Paul
Slater, S. A. ..... Worthington
Slocumb, C. H. ..... Rochester
Slocumb, J. A. ..... Plainview
Slocumb, Maude S. ..... Minneapolis
Slyfield, F. F. ..... Duluth
Smallwood, J. T. ..... Worthington
Smersh, J. F. ..... Owatonna
Smith, A. E. ..... Minneapolis
Smith, A. M. ..... Minneapolis
Smith, A. M. ..... Thief River Falls
Smith, B. A. ..... Crosby
Smith, B. F. ..... Willmar
Smith, C. M. ..... Duluth
Smith, E. H. ..... Bemidji
Smith, E. K. ..... Duluth
Smith, F. D. ..... Kasson
Smith, F. L. ..... Rochester
Smith, H. L. ..... Rochester
Smith, H. R. ..... Minneapolis
Smith, L. G. ..... Montevideo
Smith, M. W. ..... Red Wing
Smith, N. D. ..... Rochester
Smith, N. M. ..... Minneapolis
Smith, P. A. ..... Faribault
Smith, W. R. ..... Grand Marais
Smith, Wyman ..... Minneapolis
Snell, A. M. ..... Rochester
Snyder, G. W. ..... St. Paul
Soderlind, R. T. ..... Minneapolis
Sogge, L. L. ..... Windom
Sohlberg, O. I. ..... St. Paul
Sohmer, A. E. ..... Mankato
Soine, T. S. ..... Barnesville
Solhaug, S. B. ..... Minneapolis
Sommer, A. W. ..... Elmore
Souster, B. B. ..... St. Paul
Spano, J. P. ..... Minneapolis
Spicer, F. W. ..... Duluth
Spooner, A. D. ..... Rochester
Sprafka, J. M. ..... St. Paul
Sprague, P. H. ..... Rochester
Spratt, C. N. ..... Minneapolis
Stacy, L. J. ..... Rochester
Stafne, W. A. ..... Rochester
Stangl, Fred ..... St. Cloud
Stanley, C. R. ..... Worthington
Stark, W. B. ..... Rochester
Starkey, T. A. ..... Rochester
Steffens, L. A. ..... Red Wing
Steinberg, C. L. ..... St. Paul
Steiner, I. W. ..... Winona
Stelter, L. A. ..... Minneapolis
Stephan, E. L. ..... Hinckley
Stephenson, G. W. ..... Rochester
Sterner, E. G. ..... St. Paul
Steven, George ..... Byron
Stevens, G. A. W. ..... Rochester
Stevens, John ..... Gonvick
Stewart, Alexander ..... St. Paul
Stewart, A. B. ..... Owatonna
Stewart, C. A. ..... Minneapolis
Stewart, Gwendolyn ..... Faribault
Stewart, R. I. ..... Minneapolis
Stickney, Charlotte A. ..... St. Cloud
Stierle, Adolph, Jr. ..... St. Paul
Stiles, Angie G. ..... Northfield
Stillwell, W. C. ..... Mankato
Stinnette, S. E. ..... St. Paul
Stoeckmann, A. E. ..... St. Paul
Stolpestad, H. L. ..... St. Paul
Stomel, Joseph ..... Minneapolis
Strachauer, A. C. ..... Minneapolis
Strand, E. V. ..... Bayport
Strate, G. E. ..... St. Paul
Strathern, F. P. ..... St. Peter
Strathern, M. L. ..... Gilbert
Stratte, A. K. ..... Pine City
Strobel, W. G. ..... Duluth
Strout, E. S. ..... Minneapolis
Stryker, W. B. ..... Plainview
Stuart, F. A., Jr. ..... Rochester
Stuck, W. G. ..... Rochester
Stuhler, L. G. ..... Rochester
Stuhr, J. W. ..... Stillwater
Sturre, J. R. ..... Minneapolis
Stuurmanns, S. H. ..... Erskine
Sutherland, C. G. ..... Rochester
Sutherland, H. N. ..... Ely
Sutton, C. S. ..... St. Cloud
Sutton, L. F. ..... Mazeppa
Sundt, Mathias ..... Minneapolis
Swanson, Cephas ..... Minneapolis
Swanson, E. O. ..... St. Paul
Swanson, J. A. ..... St. Paul
Swanson, R. E. ..... Minneapolis
Swart, H. A. ..... Rochester
Swedenburg, A. W. ..... Thief River Falls
Sweetser, H. B. ..... Minneapolis
Sweetser, H. B., Jr. ..... Minneapolis
Sweetser, T. H. ..... Minneapolis
Sweitzer, S. E. ..... Minneapolis
Swendseen, C. G. ..... Minneapolis
Swendson, J. J. ..... St. Paul
Swenson, A. O. ..... Duluth
Swenson, Charles ..... Braham
Swenson, O. J. ..... Waseca
Swezey, B. F. ..... Buffalo

Taft, J. O. ..... Minneapolis
Tangen, G. M. ..... Canby
Tanner, A. C. ..... Minneapolis
Tanquist, E. J. ..... Alexandria
Tavenner, J. L. ..... Waseca
Taylor, C. W. ..... Duluth
Teisberg, C. B. ..... St. Paul
Telford, V. J. ..... Litchfield
Ternstrom, O. H. ..... Minneapolis
Thabes, J. A., Sr. ..... Brainerd
Thiessen, N. W. ..... Rochester
Thomas, G. E. ..... Minneapolis
Thomas, G. H. ..... Minneapolis
Thomas, G. J. ..... Minneapolis
Thompson, Albert ..... St. James
Thompson, Arthur ..... Raymond
Thompson, G. J. ..... Rochester
Thompson, V. C. ..... Marine-on-St. Croix
Thordarson, Theo. ..... Minneota
Thornby, H. J. ..... Moorhead
Thorp, E. G. ..... Rochester
Thorson, E. O. ..... Luverne
Thorson, O. P. ..... Northfield
Thysell, F. A. ..... Moorhead
Tibbetts, M. H. ..... Duluth
Tifft, C. R. ..... St. Paul
Tilderquist, D. L. ..... Duluth
Tingdale, A. C. ..... Minneapolis
Tofte, Josephine ..... Dawson
Torgerson, W. B. ..... Oklee
Tovell, R. M. ..... Rochester
Traeger, C. A. ..... Faribault
Tregilgas, H. R. ..... South St. Paul
Trueman, H. S. ..... Minneapolis
Truog, C. P. ..... Lindstrom
Trutna, T. J. ..... Silver Lake
Tunstead, H. J. ..... Minneapolis
Tuohy, E. L. ..... Duluth
Turnacliff, D. D. ..... Minneapolis
Turnbull, Robert ..... Fosston
Tweedy, G. J. ..... Winona
Tyrrell, C. C. ..... Minneapolis

Ude, W. H. ..... Minneapolis
Ulrich, H. L. ..... Minneapolis
Urberg, S. E. ..... Duluth
Urner, J. A. ..... Minneapolis

Vaaler, T. ..... Cannon Falls
Vadheim, A. L. ..... Tyler
Valentine, W. H. ..... Tracy
Van Meier, Henry ..... Stillwater
Van Slyke, C. A. ..... St. Paul
Van Valkenburg, B. F. ..... Long Prairie
Vanzant, Frances R. ..... Rochester
Vaughan, V. M. ..... Truman
Veirs, Dean ..... St. Paul
Veirs, Ruby S. ..... St. Paul
Vercellini, C. E. ..... Duluth
Vezina, J. C. ..... Mapleton
Vik, A. E. ..... Minneapolis
Vik, Melvin ..... Onamia
Vinson, P. P. ..... Rochester
Vogel, H. A. L. ..... New Ulm
Vogel, J. H. ..... New Ulm
Voldeng, K. E. ..... Rochester
Von der Weyer, Wm. ..... St. Paul
Voris, Harold C. ..... Rochester
Voyer, E. O. ..... Minneapolis
Vrooman, F. E. ..... St. Francis

Waas, C. W. ..... St. Paul
Wagener, H. P. ..... Rochester
Wahlquist, H. F. ..... Minneapolis
Waldron, C. W. ..... Minneapolis
Waldron, G. W. ..... Rochester
Walker, A. E. ..... Duluth
Walker, G. H. ..... Winona
Wall, C. R. ..... Minneapolis
Waller, J. D. ..... Wilmot
Waller, L. M. ..... Rochester
Walters, Waltman ..... Rochester
Wangensteen, O. H. ..... Minneapolis
Ward, A. W. ..... Minneapolis
Ward, P. A. ..... Minneapolis
Warham, T. T. ..... Minneapolis
Warnock, R. W. ..... St. Paul
Warren, E. L. ..... St. Paul
Warren, F. S. ..... Washington, D. C.
Watkins, C. H. ..... Rochester
Watson, J. A. ..... Minneapolis
Watson, J. D. ..... Holdingford
Watson, J. R. ..... Rochester

Watson, N. M. ..... Red Lake Falls
Wattam, G. S. ..... Warren
Watz, C. E. ..... Le Sueur
Webb, R. C. ..... Minneapolis
Webber, E. E. ..... Duluth
Webber, F. L. ..... St. Paul
Weber, H. M. ..... Rochester
Weir, J. F. ..... Rochester
Weiser, G. B. ..... New Ulm
Weisman, S. A. ..... Minneapolis
Welch, M. C. ..... St. Paul
Wellbrock, W. L. A. ..... Rochester
Wellcome, J. W. B. ..... Sleepy Eye
Welles, H. J. ..... Minneapolis
Welsh, A. L. ..... Rochester
Wenner, W. T. ..... St. Cloud
Wentworth, A. J. ..... Mankato
Werner, O. S. ..... Cambridge
West, E. J. ..... Duluth
Westby, Magnus ..... Madison
Westerman, A. E. ..... Montgomery
Westerman, F. C. ..... Montgomery
Westman, R. T. ..... Minneapolis
Wethall, A. G. ..... Minneapolis
Wetherby, Macnider ..... Minneapolis
Weum, T. W. ..... Minneapolis
Wheeler, D. W. ..... Duluth
Wheeler, M. W. ..... St. Paul
Whitacre, J. C. ..... St. Paul
Whitcomb, E. H. ..... St. Paul
White, S. M. ..... Minneapolis
White, W. D. ..... Minneapolis
Whitmore, Frank ..... St. Paul
Whitson, S. A. ..... Alden
Widen, W. F. ..... Minneapolis
Wiechman, F. H. ..... Young America
Wiese, H. F. B. ..... Minneapolis
Wilbur, D. L. ..... Rochester
Wilcox, A. E. ..... Minneapolis
Wilder, R. L. ..... Minneapolis
Wilder, R. M. ..... Rochester
Wilken, P. A. ..... Minneapolis
Wilkerson, V. A. ..... Washington, D. C.
Wilkinsen, E. A. ..... Rochester
Wilkinson, Stella ..... Duluth
Wilkowske, R. J. ..... Nerstrand
Will, W. W. ..... Bertha
Willcutt, C. E. ..... Minneapolis
Williams, A. B. ..... St. Paul
Williams, C. K. ..... St. Paul
Williams, H. L., Jr. ..... Minneapolis
Williams, H. O. ..... Lake Crystal
Williams, L. A. ..... Slayton
Williams, M. R. ..... Cannon Falls
Williams, R. V. ..... Rushford
Williams, Robert ..... Minneapolis
Williamson, G. A. ..... St. Paul
Willius, F. A. ..... Rochester
Wilmot, H. E. ..... Litchfield
Wilson, J. A. ..... St. Paul
Wilson, J. V. ..... St. Paul
Wilson, L. B. ..... Rochester
Wilson, R. H. ..... Winona
Wilson, W. E. ..... Northfield
Wilson, W. F. ..... Lake City
Wilson, Warren ..... Northfield
Wiltrout, I. G. ..... Oslo
Winnick, J. B. ..... St. Paul
Winter, J. A. ..... Duluth
Winther, Nora M. C. ..... Minneapolis
Witham, C. A. ..... Minneapolis
Withrow, M. E. ..... International Falls
Wittich, F. W. ..... Minneapolis
Wohlrabe, A. A. ..... Minneapolis
Wohlrabe, Clarence ..... Springfield
Wohlrabe, E. J. ..... Springfield
Wold, K. C. ..... St. Paul
Wolff, H. J. ..... Rochester
Wolner, O. H. ..... St. Peter
Woltman, H. W. ..... Rochester
Wood, D. F. ..... Minneapolis
Wood, G. T., Jr. ..... Rochester
Wood, H. G. ..... Rochester
Woodruff, C. W. ..... Chatfield
Woodworth, Elizabeth ..... Minneapolis
Woodworth, L. F. ..... Le Center
Workman, H. M. ..... Tracy
Workman, W. G. ..... Tracy
Wright, C. B. ..... Minneapolis
Wright, C. O. ..... Luverne
Wright, C. D. ..... Minneapolis
Wright, F. R. ..... Minneapolis
Wunder, H. E. ..... Shakopee
Wyatt, O. S. ..... Minneapolis
Wynne, H. M. N. ..... Minneapolis

Yaeger, W. W. ..... Ivanhoe
Ylvisaker, R. S. ..... Minneapolis
Yoerg, O. W. ..... Minneapolis
Young, T. O. ..... Duluth
Young, V. A. ..... Duluth
Younger, L. I. ..... Winona
Youngren, E. R. ..... St. Paul

Zachman, A. H. ..... Melrose
Zaworski, E. A. ..... Minneapolis
Zeien, Thomas ..... North Branch
Zemke, E. E. ..... Fairmont
Zierold, A. A. ..... Minneapolis
Zimmermann, H. B. ..... St. Paul
Ziskin, Thomas ..... Minneapolis

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A SURVEY OF THE CAUSES OF HAY FEVER FOR THE STATE OF MINNESOTA*

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BLACKLEY,[4] in 1873, himself a sufferer, furnished the first proof that pollens are the etiological agents of epidemic seasonal hay fever, and incidentally was the first to use the skin tests.

Pollen extracts were first used in the treatment of hay fever in 1905 by Dunbar.[8] His favorable report made increased knowledge of the causes a necessity and furnished the requisite stimuli for investigation which still continues. In the earlier investigations the plants viewed with suspicion were relatively few and many of these unjustly accused. As knowledge increased some were exonerated (*e.g.*, roses and goldenrod) and additional ones incriminated as attention became focused where it correctly belongs, upon those plants the pollens of which are wind-borne.

A number of surveys relative to the plants causing hay fever have been made in various parts of the world. The published reports for regions of the U. S. A. include those for Arizona,[20, 35] California,[21, 24, 30] Colorado,[6, 18, 34, 36] District of Columbia,[3, 5] Illinois (Chicago),[17] Louisiana,[19, 27] Massachusetts (Eastern),[23] Missouri (K. C.),[7] Mid-Southern States,[28] Montana,[12] Nevada,[1] New England,[10, 22, 33] New York,[31, 32] Ohio,[9] Oklahoma,[2] Oregon,[11] Pacific Northwest,[29] Tennessee[14] and Texas.[13, 15, 16] Notwithstanding the importance of these valuable contributions it can yet be said that knowledge concerning the pollens that actually are responsible for the 2,000,000 or more cases of hay fever in the United States is far from complete.

The data compiled from a survey of one locality are useful by way of comparison with the data compiled from another locality, but the conclusions drawn from the one cannot be applied to the other. The species listed in the survey of one region may very nearly coincide with those of another region. However, the proportionate distribution of the species in the two regions may vary greatly and if quantitative distribution is not given proper consideration, important differences may escape detection.

Before attempting the procedure of diagnosis and treatment of cases, it is obviously necessary to know what pollens cause hay fever. In addition, it is imperative to have knowledge of the flowering period and the distribution of the plants, for while some are quite ubiquitous, others are limited in distribution. Nor is the use of such information restricted to the prophylactic treatment of hay fever by injection of pollen extracts. Through careful studies of plant distribution and of the pollen content of the atmosphere, we shall be able to direct sufferers to areas where certain relief may be obtained, once an accurate diagnosis of the specific cause or causes of their condition has been made. By way of illustration, Seattle is the only city of consequence in the United States whose air is not in some degree contaminated with ragweed pollen, this fact having been determined by Durham[23] in 1929. There are areas in Minnesota where ragweed sensitive patients may obtain relief, but those sensitive to other causes are bitterly disappointed when they fail to obtain relief in the same region. Many of those who obtain relief attribute their results to climate, the more correct explanation of plant distribution being overlooked.

The determination of the specific pollen or pollens that are responsible for the illness of an individual patient is by no means simple. While

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correct conclusions are no doubt reached in the majority of cases in the hands of the physician well versed in the hay fever plants of his own region, it can be positively stated that such conclusions are always or at least nearly always inferential. In other words, the conclusion is usually based upon evidence that is circumstantial. A positive skin test does not establish a diagnosis. In addition to this it must be shown that the individual has exposure to this pollen at the time that his symptoms occur. One of us has recently interviewed a patient who was treated with ragweed pollen without benefit. The period of symptoms in this case was from June 1 to July 15, when no ragweed pollen pollutes the air. Furthermore, the skin test to ragweed was negative. Such ignorance on the part of the physician is inexcusable.

The prophylactic treatment of hay fever in Minnesota has of necessity been based upon conclusions drawn from plant surveys of other regions since no corresponding data has been published for this region. In order that the diagnosis and treatment of hay fever may be more rational and exact, the writers have attempted a check upon the hay fever causing weeds of this state.

This report is based upon clinical, field and herbarium studies. Clinical studies include histories and sensitization tests of 100 cases of hay fever among the students at the University of Minnesota selected at random without regard to season of symptoms.

The data in regard to the time of blossoming and the geographical distribution of the species involved have been gathered through many years of field observations in various parts of the state, supplemented by studies of the very extensive collections of Minnesota plants in the University herbarium.

For most of the species enumerated, a considerable length of time is given for the time of bloom. This may be somewhat misleading and a brief explanation is necessary. Seasons vary from year to year. A certain species in a given locality may bloom from one to two weeks earlier one year than another, depending upon the climatic conditions which obtain. This is especially true of those which blossom before the end of May or in other words, before summer temperatures have been definitely established for the region. Furthermore, the plants of the spring season which have an extensive north and south distribution in Minnesota have a considerable blossoming range because of the fact that the northward progress of the season is on the average only 17 miles per day. For plants of the midsummer season, there is very little difference between the southern and northern parts of the state in regard to the time of blossoming, and for plants of the autumn season conditions are usually reversed, those in the north blooming slightly earlier than individuals of the same species farther south. Other variable factors which affect the onset and duration of bloom are differences in the habitat, time of planting of cultivated species, considerable fluctuation in the number of flowers produced; all of which have had to be taken into consideration in making out the dates recorded.

Over 90 per cent of the species listed in this report occur either native or are cultivated in the region of the "Twin Cities" and for the great majority of these the initial figure cited for the blossoming period represents the earliest date on which pollination has been found to occur in this particular area. Although the greatest care has been taken to make the report in regard to the blossoming period as accurate and reliable as possible for the state as a whole, the data for the outlying stations are not as complete nor authentic as those for the "Twin Cities" region. It is therefore suggested that the data for this locality be taken as a basis and that the measure of a 17 miles per day northward advance of the season be applied to determine the approximate opening dates of pollination of the spring and early summer plants for any station in the state.*

Our first step in this study was the compilation of a list of those plants which could be suspected as causes of hay fever. For obvious reasons it is necessary to include only those plants which are regularly wind pollenated so far as the epidemic form of hay fever is concerned. This does not preclude the possibility of hay fever from insect pollenated plants where contact is intimate as in the case of gardeners, or those engaged in the handling of such crops as alfalfa and clover. For this reason, we have included alfalfa and

*According to A. D. Hopkins, other conditions being equal, the variation in the time of occurrence of a given periodical event in life activity in temperate North America is at a general average rate of four days to each 1° latitude, 5° longitude and 400 feet altitude, later northward, eastward and upward in the spring and early summer, and the reverse in late summer and autumn. In other words, the average advance of the season per day is 17 miles northward, 62 miles eastward and 100 feet upward.

clover in our list of potential causes, although they are insect pollenated. These are cut and cured at the stage of bloom and much shattering of the flowers undoubtedly occurs.

given in the first column. Since, however, common names alone are not sufficiently accurate, the proper botanical names are provided in the adjoining column. In the list the dagger (†) is

DISTRIBUTION OF PRINCIPAL GROUPS OF HAY-FEVER PLANTS IN MINNESOTA



Fig. 1. Ragweeds (Ambrosia). Three species of Ragweed, the Giant, the Common and the Western, occur throughout the lack area. The Common Ragweed extends as far as the dotted area and the Western Ragweed to the limit of shading.

Fig. 2. Wormwoods (Artemisia). Six species occur in most parts of the black area. Only two species, *A. biennis* and *A. anadensis*, are found in the cross-shaded area.

Fig. 3. Marsh Elder (*Iva xanthifolia*) occurs in most parts of the cross-shaded area.

Fig. 4. Docks (Rumex). Six species occur in the black area. Only two species, *R. acetosella* and *R. Britannica*, are fairly ommon in the cross-shaded portion.

Fig. 5. Pigweeds (Amaranthus). Two species, *A. retroflexus* and *A. graccizans*, are common in most parts of the black area. nly *A. retroflexus* extends to the limit of cross-shading.

Fig. 6. Goosefoot and Russian Thistle (Chenopodium, Salsola). Several species of Goosefoot occur in the black and cross-haded areas. The black marks the approximate limit within the State of the Russian Thistle, *Salsola Kali* var. *tenuifolia*.

In the presentation of the hay fever plants of Minnesota, it has been found convenient to make wo separate groupings or lists of the species in-olved. In the first of these the plants have been rranged seasonally and have been segregated nto twenty-four natural groups (see exceptions n footnotes). For the benefit of those who are ot familiar with the technical nomenclature, the ommon or vernacular names of the species are used to designate those species which have been tested in the clinical studies which have been carried on at the University during the last three years. The asterisk (*) marks the species which are of such general distribution, occur in great abundance and produce such quantities of pollen as to constitute a serious menace as hay fever species in most localities of the state. The figure in parentheses following the botanical name is the number under which the species may be found

in an alphabetically arranged descriptive list, which is now in manuscript form and is expected to be published as a supplement to the present study. This descriptive list notes the principal facts about the habitat, occurrence, relative abundance and geographical distribution of all the species included in the survey, and it should be possible to determine from it whether or not a species occurs at any given location in the state.

THE GROUP PRINCIPLE

The basis of the grouping followed in the foregoing list is that of close relationship, with the exception of Group 5, which includes two dis-

A LIST OF HAY FEVER PLANTS BY GROUPS WITH APPROXIMATE DATES OF POLLINATION

Common Name	*Botanical Name*	*Blossoming Season*
1. MAPLE GROUP—ACERACEÆ		
Soft or Silver Maple†	Acer saccharinum (3)	Mar. 12—Apr. 18
Red Maple†	Acer rubrum (2)	Apr. 12—25
Box Elder†*	Acer Negundo (1)	Apr. 12—30
2. BIRCH GROUP—BETULACEÆ		
Hoary or Speckled Alder†	Alnus incana (10)	Mar. 25—Apr. 12
Common Hazel†*	Corylus americana (68)	Apr. 1—20
Beaked Hazel	Corylus rostrata (69)	April 5—25
Green or Mountain Alder†	Alnus crispa (9)	Apr. 15—May 20
Ironwood or Hop Hornbeam†*	Ostrya virginiana (111)	Apr. 22—May 16
Paper or Canoe Birch†*	Betula papyrifera (40)	Apr. 25—May 10
Sweet Fern[1]	Comptonia asplenifolia (67)	Apr. 25—May 30
Bog Birch*	Betula pumila (41)	Apr. 26—May 10
Yellow Birch	Betula lutea (38)	May 1—15
River Birch	Betula nigra (39)	May 1—15
Sweet Gale[1]	Myrica Gale (109)	May 1—25
Blue or Water Beech†	Carpinus caroliniana (56)	May 5—25
3. POPLAR-WILLOW GROUP—SALICACEÆ		
Poplar, Trembling Aspen†*	Populus tremuloides (131)	Apr. 3—22
Pussy Willow	Salix discolor (149)	Apr. 5—25
Large-toothed Aspen	Populus grandidentata (130)	Apr. 8—25
Cottonwood†*	Populus deltoides (129)	Apr. 8—30
Balsam Poplar*	Populus balsamifera (128)	Apr. 15—30
Prairie Willow	Salix humilis (151)	Apr. 15—30
Heart-leaved Willow	Salix cordata (148)	Apr. 20—May 10
Peach-leaved Willow	Salix amygdaloides (147)	Apr. 25—May 12
Crack Willow	Salix fragilis (150)	Apr. 26—May 15
Golden Willow	Salix alba var. vitellina (146)	Apr. 26—May 15
4. ELM-NETTLE GROUP—URTICACEÆ		
American or White Elm†*	Ulmus americana (165)	Apr. 3—24
Slippery Elm†*	Ulmus fulva (166)	Apr. 4—25
Cork Elm	Ulmus racemosa (168)	Apr. 10—30
Siberian Elm	Ulmus pumila (167)	Apr. 10—25
Hackberry†*	Celtis occidentalis (60)	Apr. 20—May 15
White Mulberry	Morus alba (106)	May 15—30
Stinging Nettle†*	Urtica gracilis (169)	June 1—Aug. 15
Hops	Humulus lupulus (95)	July 15—Aug. 5
Hemp†*	Cannabis sativa (51)	July 15—Aug. 10
Wood Nettle.	Laportea canadensis (101)	July 5—Aug. 15
False Nettle	Boehmeria cylindrica (42)	July 20—Aug. 15
5. SEDGE-BULRUSH GROUP—CYPERECEÆ		
Peduncled Sedge	Carex pedunculata (52)	Apr. 8—May 3
Pennsylvania Sedge†*	Carex pennsylvanica (53)	Apr. 10—May 20
Long-beaked Sedge†*	Carex longirostris (54)	Apr. 28—May 15
Tussock Sedge*	Carex stricta (55)	May 1—30
River Bulrush	Scirpus fluviatilis (157)	June 9—July 20
Great Bulrush*	Scirpus validus (159)	June 15—Aug. 10
Western Bulrush	Scirpus occidentalis (158)	June 15—Aug. 5
Cat Tail†*[1]	Typha latifolia (164)	July 5—30

[1]Belongs to the Myricaceæ, a separate but closely related family.

[1]Not closely related to the Sedge-Bulrush family, but arbitrarily included here to avoid multiplicatior of groups.

Common Name	*Botanical Name*	*Blossoming Season*
6. ASH GROUP—OLEACEÆ		
White Ash†	Fraxinus americana (87)	Apr. 15—May 10
Green Ash†*	Fraxinus lanceolata (88)	Apr. 17—May 10
Black Ash†*	Fraxinus nigra (89)	Apr. 18—May 15
7. OAK GROUP—FAGACEÆ		
Bur Oak†*	Quercus macrocarpa (136)	Apr. 30—May 29
Black Oak	Quercus velutina (137)	May 1—15
Hills Oak†*	Quercus ellipsoidalis (135)	May 2—22
Red Oak†*	Quercus borealis (133)	May 5—25
Scarlet Oak	Quercus coccinea (134)	May 7—20
White Oak†*	Quercus alba (132)	May 16—27
8. SWEET VERNAL GRASS GROUP—TRIBE PHALARIDEÆ		
Holy Grass, Seneca Grass*	Hierochloe adorata (92)	May 8—30
Sweet Vernal Grass†	Anthoxanthum odoratum (22)	June 1—July 1
Reed Canary Grass†*	Phalaris arundinaceae (115)	June 5—July 20
9. WALNUT GROUP—JUGLANDACEÆ		
Butternut†*	Juglans cinerea (97)	May 10—26
Black Walnut†	Juglans nigra (98)	May 15—30
Pignut Hickory	Carya cordiformis (57)	May 20—June 5
Shellbark Hickory†	Carya ovata (58)	May 20—June 5
10. PLANTAIN GROUP—PLANTAGINACEÆ		
Rib Grass†*	Plantago lanceolata (119)	May 20—Aug. 1
Common Plantain†*	Plantago major (120)	June 1—Aug. 15
Pursh's Plantain	Plantago Purshii (121)	June 1—July 15
Large-bracted Plantain	Plantago aristata (118)	June 15—Aug. 1
Pale Plantain	Plantago Rugelii (122)	June 20—Aug. 10
11. DOCK OR SORREL GROUP—POLYGONACEÆ		
Sheep Sorrel†*	Rumex acetosella (139)	May 20—July 1
Rhubarb	Rheum rhaponticum (138)	May 25—June 20
Curled Dock†*	Rumex crispus (142)	May 29—July 15
Peach-leaved Dock	Rumex altissimus (140)	June 1—July 15
Golden Dock	Rumex persicarioides (144)	June 1—July 30
Pale Dock†*	Rumex mexicanus (143)	June 6—July 20
Knot Grass, Door Weed	Polygonum aviculare (127)	June 20—Oct. 15
Bitter Dock†	Rumex obtusifolius (145)	July 10—Aug. 15
Great Water Dock	Rumex Britannica (141)	July 10—Aug. 15
12. TIMOTHY GROUP—TRIBE AGROSTIDEÆ		
Mountain Rice	Oryzopsis asperifolia (110)	May 20—June 10
Meadow Foxtail†	Alopecurus pratensis (11)	May 25—July 15
Porcupine Grass	Stipa spartea (162)	June 1—20
Timothy†*	Phleum pratense (116)	June 10—July 25
Red Top†*	Agrostis alba (9)	June 15—Aug. 1
Canada Blue-joint*	Calamagrostis canadensis (49)	June 15—Aug. 1
Long-leaved Reed Grass	Calamovilfa longifolia (50)	July 1—Aug. 10
Satin Grass*	Muhlenbergia mexicana (107)	Aug. 1—Sept. 1
Wild Timothy*	Muhlenbergia racemosa (108)	Aug. 1—Sept. 1
13. BLUE GRASS GROUP—TRIBE FESTUCEÆ		
Low Spear Grass†*	Poa annua (123)	May 22—Sept. 10
June Grass†*	Poa pratensis (125)	May 28—July 10
Hungarian Brome Grass†*	Bromus inermis (47)	May 29—July 15
Crested Koeleria†	Koeleria cristata (100)	June 1—July 15
Canada Blue Grass†	Poa compressa (124)	June 5—July 15
Orchard Grass†*	Dactylis glomerata (71)	June 5—July 15
Slender Fescue	Festuca octoflora (84)	June 5—July 15
Reed Meadow Grass	Glyceria grandis (91)	June 5—July 15
Fowl Meadow Grass*	Poa triflora (126)	June 10—July 20
Sheep's Fescue Grass†	Festuca ovina (85)	June 15—July 25
Cheat, Chess	Bromus secalinus (48)	June 20—July 20
Meadow Fescue†	Festuca elatior (83)	June 25—July 30

Common Name	*Botanical Name*	*Blossoming Season*
13. BLUE GRASS GROUP—TRIBE FESTUCEÆ *(cont.)*		
Fringed Brome Grass	Bromus ciliatus (45)	July 1—Aug. 1
Poverty Grass, Soft Chess	Bromus hordaceus (46)	July 10—Aug. 10
Rattlesnake Grass	Glyceria canadensis (90)	July 10—Aug. 10
Stink Grass†	Eragrostis megastachya (81)	July 20—Sept. 10
Purple Love Grass	Eragrostis pectinacea (82)	July 20—Aug. 5
Reed Grass	Phragmites communis (117)	Aug. 1—Sept. 1
14. RYE GROUP—TRIBE HORDEÆ		
Rye†*	Secale cereale (153)	June 1—20
Quack Grass†*	Agropyron repens (6)	June 10—Aug. 1
Slender Wild Rye	Elymus striatus (79)	June 15—July 15
Squirrel Tail Grass†*	Hordeum jubatum (94)	June 20—Aug. 1
Awned Wheat Grass[1]	Agropyron caninum (5)	July 1—Aug. 5
Slender Wheat Grass†	Agropyron tenerum (7)	July 1—Aug. 10
Nodding Wild Rye	Elymus canadensis (78)	July 5—Aug. 10
Virginia Wild Rye	Elymus virginicus (80)	July 5—Aug. 15
Corn, Maize†*[1]	Zea Mays (174)	July 20—Aug. 20
15. ALFALFA GROUP—LEGUMINOSÆ		
Alfalfa†	Medicago sativa (103)	June 4—Sept. 15
Sweet Clover†	Melilatus alba (105)	June 6—Oct. 1
Red Clover†	Trifolium pratense (163)	June 12—Sept. 15
16. MILLET GROUP—TRIBE PANICEÆ		
Scribner's Panic Grass	Panicum Scribnerianum (112)	June 5—July 10
Switch Grass	Panicum virgatum (113)	July 1—Aug. 10
Pigeon Grass*	Setaria glauca (154)	July 1—Aug. 30
Finger Grass, Crab Grass†*	Digitaria sanguinalis (73)	July 1—Aug. 30
Barnyard Grass†*	Echinochloa Crus-galli (76)	July 1—Aug. 20
Small Crab Grass	Digitaria humifusa (74)	July 10—Sept. 10
Green Foxtail†	Setaria viridis (156)	July 15—Sept. 1
Sandbur†*	Cenchrus carolinianus (61)	July 20—Aug. 15
Italian Millet	Setaria Italica (155)	Aug. 20—Sept. 20
17. OAT GROUP—TRIBE AVENEÆ		
Oat Grass	Arrhenatherum elatius (23)	June 15—July 15
Wild Oat Grass	Danthonia spicata (72)	June 15—July 20
Purple Oat Grass	Melica striata (104)	June 15—July 20
Wild Oats†	Avena fatua (34)	June 20—July 20
Oats†	Avena sativa (35)	July 1—30
18. PIGWEED GROUP—AMARANTHACEÆ		
Pigweed, Red-root†*	Amaranthus retroflexus (18)	June 15—Sept. 15
Green Amaranth	Amaranthus hybridus (17)	June 15—Aug. 30
Tumbleweed†*	Amaranthus graecizans (16)	June 20—Aug. 30
Prostrate Amaranth	Amaranthus blitoides (15)	July 1—Aug. 20
Water Hemp	Acnida tuberculata (4)	July 1—Aug. 20
Cockscomb	Celosia argentea (59)	July 1—Sept. 10
19. RUSSIAN THISTLE GROUP—CHENOPODIACEÆ		
Lamb's Quarter†*	Chenopodium album (62)	June 15—Sept. 30
Strawberry Blite	Chenopodium capitatum (63)	June 30—Aug. 15
Narrow-leaved Goosefoot†	Chenopodium leptophyllum (65)	July 1—Aug. 15
Red Goosefoot	Chenopodium rubrum (66)	July 1—Aug. 20
Maple-leaved Goosefoot*	Chenopodium hybridium (64)	July 1—Sept. 15
Russian Pigweed	Axyris amaranthoides (36)	July 1—Aug. 15
Western Blite	Dondia depressa (75)	July 1—Aug. 15
Russian Thistle†*	Salsola Kali var. tenuifolia (152)	July 5—Aug. 30
Kochia, Burning Bush†*	Kochia scoparia (99)	July 12—Aug. 30
Winged Pigweed	Cycleloma atriplicifolia (70)	July 15—Aug. 30
Shad Scale†	Atriplex patula (33)	July 25—Aug. 30

[1]Does not belong to the Rye Tribe, but is inserted here to avoid multiplication of groups.

Common Name	*Botanical Name*	*Blossoming Season*
20. GRAMA GRASS GROUP—TRIBE CHLORIDEÆ		
Hairy Mesquite Grass	Bouteloua hirsuta (44)	July 1—Aug. 10
Racemed Grama Grass	Bouteloua curtipendula (43)	July 5—Aug. 5
Beckmannia†	Beckmannia erucaeformis (37)	July 10—Sept. 1
Tall Marsh Grass	Spartina Michauxiana (161)	July 15—Aug. 15
Goose Grass†	Eleusine Indica (77)	July 20—Sept. 15
21. WILD RICE GROUP TRIBE ORYZEÆ		
Indian Rice, Wild Rice†*	Zizania palustris (176)	July 5—Aug. 10
Wild Rice†	Zizania aquatica (175)	July 10—Aug. 1
Rice Cut Grass†	Leersia oryzoides (102)	July 20—Aug. 10
22. SAGE-WORMWOOD GROUP—COMPOSITÆ (ANTHEMIDEÆ)		
Common Mugwort*	Artemisia vulgaris (32)	July 6—Sept. 1
Absinth†	Artemisia absintheum (24)	Aug. 1—Sept. 15
Wild Wormwood*	Artemisia caudata (29)	Aug. 1—Sept. 10
Linear-leaved Wormwood†*	Artemisia dracunculoides (28)	Aug. 1—Sept. 15
Pasture Sage†	Artemisia frigida (29)	Aug. 5—Sept. 20
Prairie Sage†*	Artemisia ludoviciana (incl. gnaphalodes) (30)	Aug. 5—Sept. 20
Saw-leaf Wormwood*	Artemisia serrata (31)	Aug. 10—Sept. 15
Biennial Wormwood†*	Artemisia biennis (25)	Aug. 10—Oct. 1
Canada Wormwood	Artemisia canadensis (26)	Aug. 15—Oct. 1
23. SORGHUM GROUP—TRIBE ANDROPOGONEÆ		
Blue Stem†*	Andropogon furcatus (19)	July 15—Aug. 15
Indian Grass†	Sorghastrum nutans (160)	July 15—Sept. 10
Broom Beard Grass†*	Andropogon scoparius (20)	July 20—Aug. 20
Sorghum†*	Andropogon sorghum (21)	July 25—Aug. 30
Sudan Grass	Andropogon sorghum var. sudanensis (93)	July 25—Aug. 30
24. RAGWEED GROUP—COMPOSITÆ (AMBROSIACEÆ)		
Western Ragweed†*	Ambrosia psilostachya (13)	July 28—Sept. 1
Giant Ragweed†*	Ambrosia trifida (14)	Aug. 2—Sept. 15
Common Ragweed†*	Ambrosia artemisiifolia (12)	Aug. 5—Oct. 15
False Ragweed†	Franseria acanthicarpa (86)	Aug. 10—Sept. 10
Marsh Elder†*	Iva xanthifolia (96)	Aug. 10—Oct. 1
Beach Clotbur	Xanthium echinatum (172)	Aug. 10—Sept. 10
Cocklebur†	Xanthium canadense (171)	Aug. 15—Sept. 15
Cocklebur†	Xanthium speciosum (173)	Aug. 15—Sept. 20

tinct families, the Cyperaceæ, represented by the sedges and bulrushes, and the Typhaceæ, represented by the cattails.

Scheppergrell,[35, 36] among the early investigators in this country, disregarding the species differences, attempted to make the problem of diagnosis and treatment very simple by classifying the hay fever plants in four groups as follows:

1. Ambrosiaceæ (Ambrosia, Franseria, Iva and Xanthium)
2. Artemisiæ (Sage brush and Wormwood)
3. Gramineæ (All grasses)
4. Chenopodiaceæ (Russian Thistle and Goosefoot, also the Amaranth and Dock families)

He expressed a belief that a pollen extract made from any member of a group would protect against any other member of the same group. While the group relationship is important to recognize, for to a certain extent it simplifies or at least establishes an orderly basis for diagnosis, the attempt at simplification referred to above as proposed by Scheppegrell, grouped together plants which were too widely separated in relationships. In the fourth group of his classification he has included three separate and distinct families. These may be located in our grouping by the numbers 11, 18, and 19.

In our classification we feel that botanical relationships clearly warrant the recognition of each group, with the possible exception of the rank given to subdivisions of the grass family. Our position here is one of caution based upon differences of opinion as stated in the literature. From Cooke and Vanderveer we quote the following: "On the whole we can say that an individual reacting to one grass reacts to all, which

bespeaks a biological entity of the protein derived from the pollens of the gramineæ."

Watson and Kibler deny this and contend that grass cases seen by them in the southwest do not react to timothy or rarely so, and those who do react usually have lived in regions where timothy is grown. From Rackeman we quote: "While Chabot has shown that there is considerable immunologic overlapping between pollens of one grass and another, we believe that the question of a specificity is still an open one. There is much less uniformity in the period of symptoms in the grass sensitive cases than in ragweed cases. These observations indicate, we believe, that different patients are sensitive to different grasses; that one grass is the primary factor in one case and another grass in another."

Believing that the question of specificity among the grasses has not been definitely disposed of, we have taken an intermediate position and have used the botanical subdivisions of the grass family as the basis for grouping. Each grass group is recognized by the botanist as a Tribe and each group includes plants which stand closer in relationship to other members of the same group than to those of other groups. In our classification there are nine of these subdivisions of the grass family designated by the numbers 8, 12, 13, 14, 16, 17, 20, 21, and 23. Should future work demonstrate that the pollens of grasses all contain only one and the same hay fever causing substance, then these groups may all be incorporated into one. This too would make it unnecessary to consider species from the standpoint of diagnosis and treatment. It would seem well for the present to bear in mind the possibility that a hay fever causing principle characteristic of the grass family may be present in all grass pollens but that a species may produce an additional substance peculiar to itself that is capable of causing hay fever.

THE CLINICAL APPLICATION

Clinical study is the only means known at present that will enable us to say whether a given pollen does or does not contain hay fever exciting properties. The positive skin test and the ophthalmic reaction are the most generally recognized measures for determining this point. We had hoped to study by these mechanisms the pollens of all the plants which we have listed. In this we were to a certain extent disappointed, for although orders were placed with the leading pollen exchanges in the United States, many of the pollens could not be had. However, the number of pollen specimens that were obtained was so great that to test each individual for these singly would have consumed so much time as to render the procedure very impractical. Various workers, and particularly Chabot, have demonstrated considerable overlapping of immunological reactions in related species and genera. For this reason, we felt justified in making up mixtures of related species and genera for routine preliminary tests. By this procedure we were able to make a preliminary survey of the sensitivity of the individual patients in regard to the entire list of plants in twenty-four tests. The twenty-four groups are those of corresponding numbers as shown by the list of the hay fever causing plants as set forth in the preceding pages. Those pollens used in each group for skin testing are designated thus (†). The group mixtures contained equal amounts of the pollen so designated in each group.

METHODS OF TESTING

The routine preliminary tests were made by the scratch method. A drop of N/10 sodium hydroxid was placed upon the scratch, to which a liberal amount of the dried pollen was added.

The reactions were classified as 1 plus, 2 plus, 3 plus and 4 plus, respectively, but since little or no correlation exists between the degree of skin reactions and the severity of the clinical symptoms, the data to be presented here make no distinction as to degree of reaction.

Questionable positives were rechecked by intradermal injections of extracts of those pollens in question. Reaction was considered negative when no reaction was obtained to extracts containing .1 mg. of nitrogen per c.c.

The skin tests were routinely applied to 100 cases of hay fever among the students at the University of Minnesota without selection as to severity or the season of symptoms. A positive skin test is generally accepted as proof that the pollen in question is capable of exciting hay fever symptoms. In diagnosing a given case, however, the skin test must be evaluated in terms of the dates of incidence in the atmosphere of the pollen which produced the positive skin test as correlated with the season at which symptoms occur.

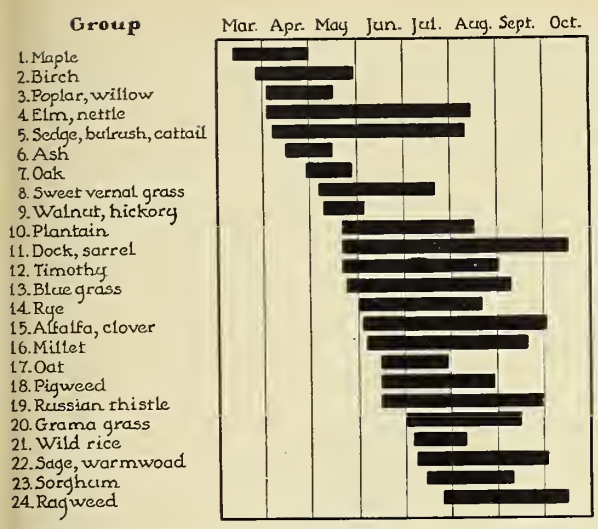


Chart 1. The pollenating periods of the several groups of pollens used in this study.

THE RELATIVE IMPORTANCE OF THE GROUPS

We have attempted to appraise the relative importance of the groups by the process of analysis of the 100 clinical cases of hay fever. In Chart 2 are shown the number of cases showing symptoms for each month from April to October, inclusive. Since the total number of cases used for the study is 100, the number of cases for each month may also be read as %. The percentage incidence of hay fever by months is as follows:

Month	April	May	June	July	Aug.	Sept.	Oct.
Per cent	3	24	49	56	89	85	59

In Chart 2 are also shown the number of positive skin reactions obtained for each group which was producing pollen concomitant with the period of symptoms.

By way of illustration, it will be seen that in three cases symptoms were present in April. Groups 1 to 6 inclusive were shedding pollen during this period, as may be readily visualized by reference to Chart 1. Chart 2 shows the relative importance of the Groups 1 to 6 in relation to these three cases, as follows:

Case 1	+					+
Case 2	+		+	+	+	+
Case 3	+	+	+			+

Group 1 Maple, 2 Birch, 3 Poplar, 4 Elm, 5 Sedges, 6 Ash

This indicates that, given an equal amount of distribution, the Maple and Ash groups are of equal importance. The Cottonwood or Poplar group ranks second while the other three groups rank the same, not more than one reaction being obtained to each.

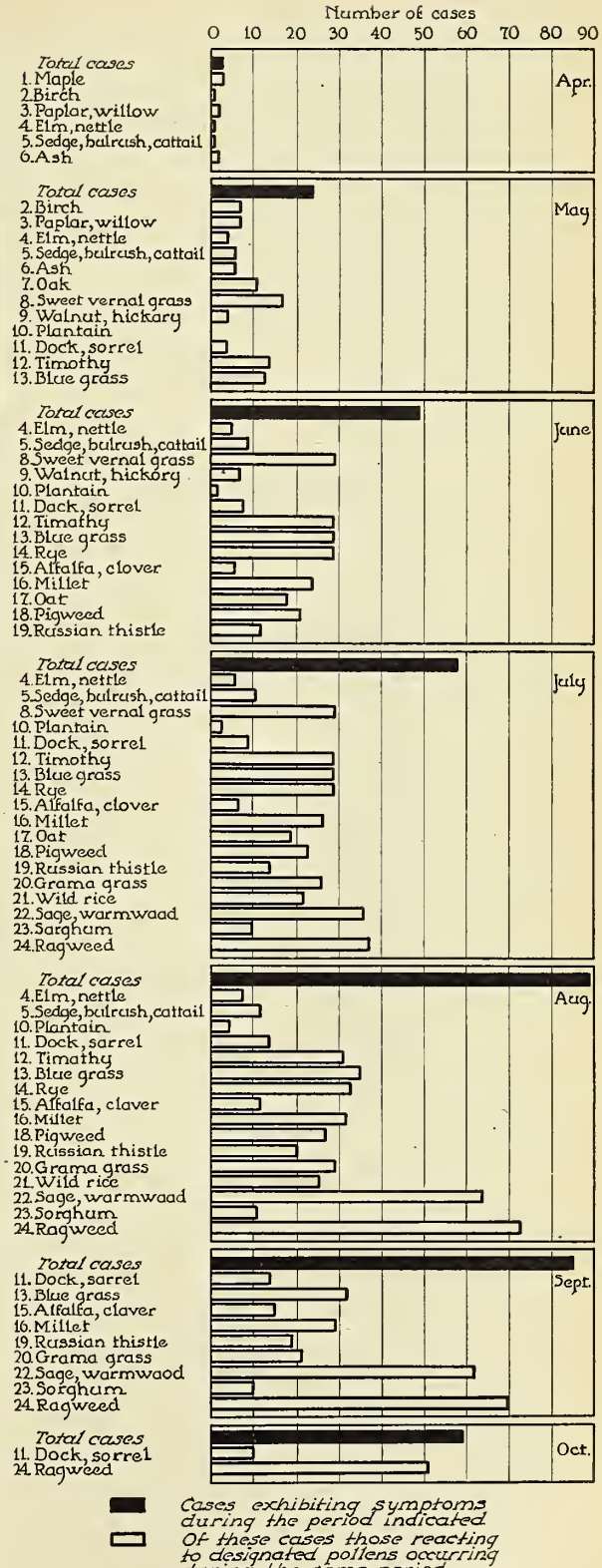


Chart 2. The incidence of symptoms by months in one hundred cases of hay fever and the relative importance in these cases of the various pollens in the atmosphere during the months in which their symptoms occur.

Space forbids a discussion of the cases and causes for each month, but the reader may easily analyze for himself the relative importance of the several groups occurring in each month by a study of Chart 2.

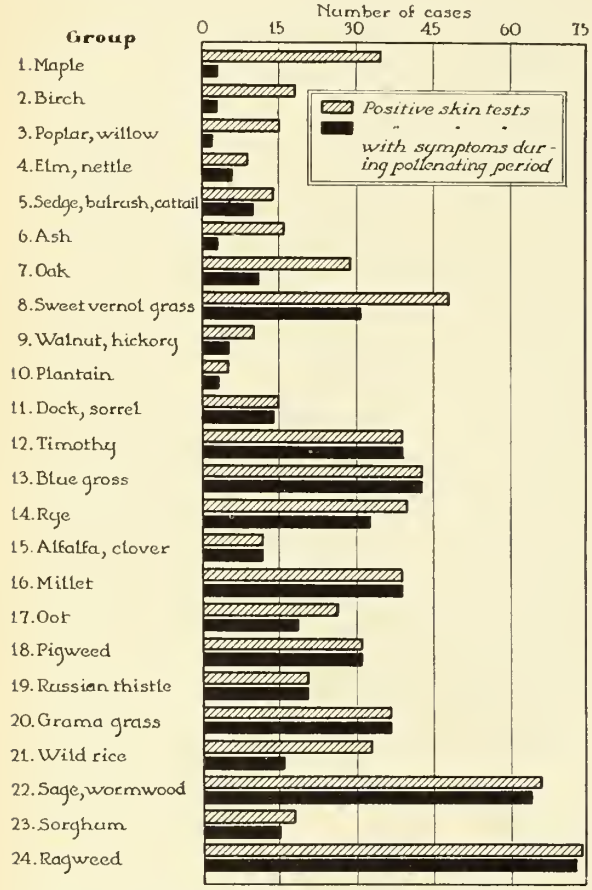


Chart 3. The importance of evaluating the positive skin test in terms of the periods of pollenation and of symptoms is indicated by the lack of correlation between these factors.

Another approach to the evaluation of the importance of the several groups which seems legitimate is a comparison of the total number of positive skin reactions obtained for each group. However, the positive skin reaction becomes significant only when the individual upon whom it is produced has hay fever coincidentally with the flowering period of the plant or group of plants under consideration. For example, a study of Chart 3 shows that although thirty-five individuals (*i.e.*, 35 per cent) gave positive skin reactions to the Maple group, only three of these complain of symptoms corresponding to the period during which pollen is shed by members of this group.

This lack of correlation between the number of positive skin tests and clinical hay fever coincident with seasonal incidence of the pollen is seen to be greatest in those groups which flower earliest. As the season advances correlation increases. Perfect correlation occurs for Groups 11 (Polygonaceæ), 15 (Alfalfa Group), 18 (Amaranthaceæ), 19 (Chenopodiaceæ), 22 (Artemiseæ), and 24 (Ambrosiaceæ).

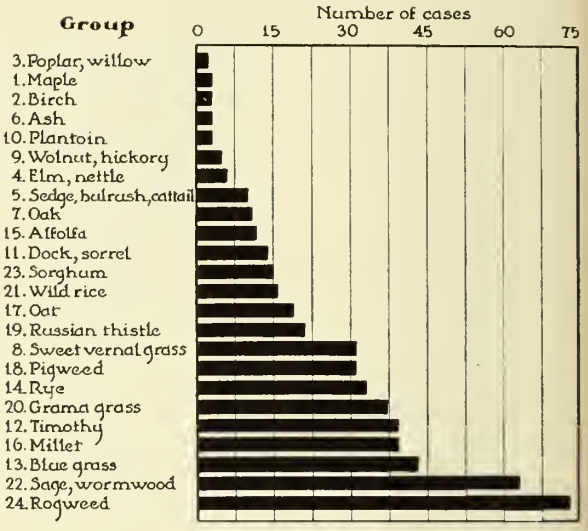


Chart 4. The relative importance as causes of hay fever of the several pollen groups included in this study, based upon the number of cases having symptoms corresponding in time to the pollenating period of the plants to which they give positive skin tests.

The importance of the insect pollenated alfalfa groups as indicated by this study was surprising to us as 10 per cent of those tested gave positive skin tests and also had clinical symptoms corresponding to the pollenating period of the group. While we feel that this needs further investigation, we wish to call attention to the fact that in the past the importance of other groups has been evaluated upon a similar basis.

A somewhat clearer picture of the relative importance of the several groups is shown in Chart 4. This shows the number of the 100 examined who have clinical symptoms during the pollenating periods of the groups to which they give positive skin reactions. Since the total number of cases is constant (100) these may be read as per cent values.

MULTIPLE SENSITIZATION

It is obvious from Chart 4 that a considerable number of individuals must have multiple sensitivity. If we total the cases for all groups we get a total of 533 group cases, but since only 100 pa-

tients are involved this leads to the conclusion that there is an average of 5.33 group sensitivities to each case. This is a point which is often overlooked.

The ragweed group, as one would expect from reports from other parts of the Mississippi Valley, ranks first in importance (Chart 4), being a causative factor in 73 per cent of cases. We wish to emphasize the fact, however, that the ragweed group is not the sole causative factor in these seventy-three cases. As a matter of fact, no more than four of the seventy-three cases (5.5 per cent) were sensitive to the ragweed group alone. We found that of the seventy-three cases sensitive to the ragweed group, fifty-eight (80 per cent) were also sensitive to the wormwood group; eighteen (24.6 per cent) to the pigweed group; thirteen (17.8 per cent) to the Dock group; fifteen (20 per cent) to the Russian Thistle group; and thirty-three (45.2 per cent) sensitive to grass groups which pollenate in the fall period. Since all of the groups involved in the multiple sensitizations are shedding considerable pollen during the fall period, one may well question the time honored opinion often expressed in the advertisements of the manufactures of pollen extracts that the ragweed is responsible for 80 per cent of the cases of fall hay fever. That approximately that per cent of cases are sensitive to ragweed is probably correct, but as we have already shown, it is the sole cause in a relatively small number (5.5 per cent) of cases.

Lest we be misunderstood we hasten to add that we have not intended to create the impression that in our opinion the importance of the ragweeds has been overestimated; rather that the complicating factors mentioned above have been underestimated. We believe that our contention is adequately supported by the fact that we see patients who are sensitive to these complicating groups who are not sensitive to ragweed, yet who have symptoms equally as severe as many of the ragweed sensitive cases during the same period. Since these pollens acting alone are able to produce severe hay fever, it is unreasonable to suppose that where multiple sensitization exists, the patient may be relieved by the administration of ragweed pollen extract alone. Unless multiple sensitization is looked for, not only is the diagnosis incomplete but an unsatisfactory result from treatment is inevitable.

In conclusion may we state that it gives us pleasure to present this material to the medical profession of Minnesota. If it shall serve to place the diagnosis and treatment of the many hay fever sufferers of this state on a more accurate basis, we shall feel that the great amount of time and work entailed has not been in vain.

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ALLERGY IN THE FIELD OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY*

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TO begin with, the title of my paper is to some extent a misnomer, since it is naturally impossible to discuss allergy in any field as a separate entity. Despite all the definitions of allergy that have been made or attempted, I feel like attempting another, which perhaps will not be altogether original and not perhaps any more satisfactory than others already formulated, but which has the merit at least of rendering my own ideas on the subject more clear and definite. Von Pirquet first used the term and defined it as "Reactionsfähigheit," or a changed reaction capacity which an organism gains through recovery from disease, or through treatment with foreign substances. But since of two organisms treated in exactly the same way with exactly the same antigen, one may develop this Reactionsfähigheit in an extreme degree, and the other not at all, since indeed it seems impossible to develop it in whole groups of organisms of certain species, whereas it can be developed with the utmost ease in other groups of the same species, and since furthermore certain species, such as the guinea pig, exhibit this tendency to changed reaction capacity to an extraordinary extent, whereas other species, such as men and rats, exhibit it only in a comparatively limited way, it has always seemed to me that the matter goes deeper than anything involved in Von Pirquet's definition. I have come to look upon allergy as the background, perhaps the inherited, I think at least often the inherited background, the essential constitutional characteristic, which gives to the individual, or even to the species the possibility of becoming sensitized. Or it might be better to say gives such a possibility in an unusual degree for it may be true that all individuals could be sensitized under certain conditions, that is to say by, *e.g.*, enormous doses on top of a resistance reduced in ways that we do not understand.

It is certain then that to talk about allergy in any field, whether ophthalmology, or gastroenterology, or any other, would have a tendency to bring about too restricted a view, to cause us to lose sight of the underlying, basic thing that allergy really is, unless at least we keep our thinking very clear. We can, of course, talk about the phenomena, or series of phenomena, brought about by the operation of allergy in any field. These, I believe, it would be proper to refer to as anaphylactic phenomena, since anaphylaxis might be defined as the series of phenomena resulting from the exposure of a sensitized animal or an allergic animal to the influence of the antigen to which it is sensitive.

I have no intention of discussing further the varying shades of meaning of the terms allergy, or anaphylaxis, but I would like to draw your attention particularly to the well known fact that artificially induced sensitization in animals is highly specific, the animal reacting only to the particular antigen used in the first place, whereas the allergic state in man is usually characterized by multiple sensitiveness, the individual reacting often to many different substances. Desensitization in an artificially sensitized animal is usually definite and easy to bring about, whereas in the allergic state of human beings we are confronted by much more difficult problems in this regard. There are many other differences, but it would not be possible or even germane to my present purpose to discuss them here. I have mentioned these two only to prepare your minds in advance for the conclusion to which everyone who persists in the study of the subject eventually comes, viz., that the *specific* diagnosis and treatment of the allergic state present problems that are by no means easy, and that, in spite of all that has been accomplished, there is an unexplored ocean of knowledge before us.

Which brings me first to the general problem of the diagnosis of the allergic state. A patient may complain of attacks of sneezing and watery discharge of such a character that one may well question whether the slight and occasional im-

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pact of a nearly normal middle turbinate upon a somewhat deflected septum can have any causative relationship to the symptoms. Or another comes to be refracted on account of headaches for which others have not been able to find any cause, but he has perhaps orthophoria and emmetropia or at most one-half diopter of hyperopia or two or three degrees of exophoria. The thinking man turns often to the consideration of the possibility of an allergic vasomotor rhinitis, or an allergic migraine, or an allergic this, that, or the other as the case may be. Through what processes must his mind travel before the possibility becomes to him a probability?

I should say that he must consider first the essential underlying phenomena of all allergy and ask himself whether the symptoms he is observing are consistent with these phenomena. After all there seems to be only two of them and on those two all the varied manifestations of allergy in all or any part of the body are based. The first of the two is increased irritability and spasm of smooth muscle tissue. The second is increased capillary permeability. Asthma can readily be explained on the basis of the first; vasomotor rhinitis and migraine just as readily on the basis of the second. The point is that if the symptoms under consideration can not be explained on the basis of either or both phenomena they are almost surely not of allergic origin.

But the mere ability to explain the symptoms on such a basis would certainly not be conclusive proof that they were of allergic origin. One should go much further. He should search for other manifestations of allergy. It would be very confirmative of the allergic character of attacks of rhinitis to find that the patient was also subject to urticaria, or eczema or asthma, or any other disease of known allergic origin.

In addition one must inquire closely into the family history for it has been abundantly proven that allergy runs in families. I think it is rare to find a true case of allergy where this family relationship cannot be shown in a greater or lesser degree. It is not alone in the interests of diagnosis that this relationship should be traced as far as possible in every individual case, but also in order that our general knowledge of the subject may be increased through this contribution to exact observation and classification.

Skin reactions, when they can be obtained, are, of course, almost positive proof of the existence of an allergic state. I have now reference only to the diagnosis of allergy and not to the question of a determination of the particular antigen or antigens to which the individual may be sensitized, of which I will speak in particular shortly. Van Leeuwen and his co-workers in Holland have shown that there is one antigen to which practically all allergic individuals give positive skin reactions, and to which on the other hand almost all non-allergic subjects give negative reactions. Curiously enough this substance is human dandruff. If this observation is confirmed it should prove of value in the determination of the existence of the allergic state, at least so far as the simplification of the skin tests are concerned. Lastly, one must determine the presence or absence of a blood eosinophilia. Nothing is better proven than that the vast majority of allergic individuals exhibit this phenomenon. But it should be remembered that it is to be found as a rule, at least in any very noticeable degree, only during active manifestations. It is not only in the blood that large numbers of eosinophiles are to be found. They exist in smears taken from discharges from the affected tissues, as for instance the conjunctiva, the nasal, pharyngeal, and bronchial mucous membranes, and also in the tissues themselves. It should be remembered, however, that this is not a constant phenomenon—that in fact, as Kahn and Stout have lately shown, the eosinophiles may disappear entirely or nearly entirely from the nasal discharges during extremely violent allergic rhinitis and also during periods of intercurrent bacterial infections.

In recapitulation then, one diagnoses the state of allergy without reference to the particular antigen producing the symptoms by: (1) the existence of symptoms that could possibly arise from increased smooth muscle iritability or increased capillary permeability or both; (2) the presence of other manifestations of allergy; (3) a family history of allergy; (4) a blood eosinophilia or the presence of eosinophiles in the discharges from the infected tissues or in the tissues themselves; and (5) positive skin tests.

There has been a tendency of late to discount the value of skin tests so far as a determination of the specific antigen causing the symptoms is concerned. The common occurrence of multiple sensitization and, as Barber has pointed out, the

absence of antibodies from the skin altogether though they may be present in other organs, or their presence in one skin area though not in another, are circumstances that sometimes make such a determination by those tests difficult or impossible. This is particularly true in the case of food allergy. Here one is often driven to food elimination tests to determine the trouble-causing substance. In cases of sensitization to air-borne substances, such as pollens and animal emanations, the determination by means of skin tests is often easier. But the whole subject of the diagnosis of specific antigens is full of such complexities that, as has been said, it requires the instincts of a detective to follow it out in many cases. One must neglect no clues offered by the history of the case, by the occupation, the mode of life, the place of residence, a change of residence, the time of attacks, whether referring to the time of day or the time of year. How else can one determine the cause of the attacks in a case sensitized to the shell of eggs and yet able to eat the contents of the eggshell with impunity—for such a case has been reported. Cases are known sensitive to the meat of hens but not of roosters. Rowe reports a case sensitive to roasted, salted peanuts but not to roasted unsalted peanuts, nor to salted, unroasted peanuts. It would be interesting, if one had the time, to enter more fully into this phase of the subject.

In the field of Ophthalmology and Oto-laryngology, there are many diseases, the symptoms of which lend themselves to explanation on the basis of increased smooth muscle irritability or of increased capillary permeability, or of both. The allergic nature of perhaps a majority of these diseases has indeed been proven. Others, undoubtedly, will be proven. Rowe contends that "allergy is probably, next to infection, the most common and important etiological agent in human symptomatology." So far as the eye is concerned Mills and Martyn, in a recent article, mention recurrent conjunctivitis, scleritis, chronic and some acute uveitis, presenile cataract, vitreous opacities and degeneration, retinal edemas, degenerations and recurrent hemorrhages, sympathetic ophthalmitis, retrobulbar neuritis, retinal detachment and exudative glaucomas as conditions where one must often take into consideration the possibility of an allergic basis. Certainly they might all be due to an altered chemistry of the eye fluids and this altered chemistry can be easily explained by increased capillary permeability, allowing transudation of colloids into the fluids and tissues of the eye, whereas in health these fluids and tissues are almost free from colloids. The presence of split protein products such as urea, amino acids, creatine, etc., in the eye fluids has been chemically demonstrated in many if not all of these conditions by Duke-Elder, Magitot, and others.

In the domain of oto-laryngology, we have perhaps been quicker to recognize the possible allergic background of many pathological conditions, because, of course, they are on the whole more evident. The manifest influence of pollens in the production of symptoms rather loosely grouped under the term hay fever, an influence recognized now for many decades, has stimulated the search for other possible antigens, for other pathological conditions which might be explained on a hitherto unrecognized allergic basis. The search has been a successful one. We know now that almost innumerable substances may be responsible for acute rhinitis, chronic rhinitis, seasonal rhinitis, perennial rhinitis, sinusitis, pharyngitis, laryngitis. I am using these terms merely in accord with custom, well aware as I am that they connote inflammation and that the pathology of inflammation is altogether distinct from that of allergic reactions. I wish that I could enter into the subject more fully but time forbids. However, we ascribe true inflammations to the action of bacteria and bacteria must grow and develop in the tissues before the inflammation can ensue, a process requiring time. On the contrary the reaction to the presence of an antigen is seldom delayed and can develop almost with the rapidity of—I had nearly said lightning. I once sat at dinner with a certain lady who appeared to be in perfect health. Before the dessert course, she complained of sudden numbness and swelling in her lips, her tongue, her throat. Her respiration became embarrassed and for a time, I was alarmed. The throat and even the mouth were edematous. The uvula was nearly the size of a hazel nut but the symptoms subsided quickly under the influence of ice and adrenalin. She had had a few milder attacks of the same kind within the previous year or two, and had noticed that they always came on after eating salads. But often, too, she ate salads with impunity. Recollection and investigation developed the fact that she was sensitized only to a certain salad

dressing in which cottonseed oil instead of olive oil was used. She was, however, highly allergic, with a clear history of asthma, hay fever, prurigo and skin eruptions. Amongst her near relatives, there were several distinctly allergic histories to be obtained.

I have perhaps erred in taking any of the little time at my disposal to refer to an acute case at all. I did it merely to illustrate my point. But the allergic character of the acute cases is usually easily enough recognized, the proper measures are taken and the attack subsides. It is the more chronic cases that put us on our mettle, the perennial forms, *e.g.*, of rhinitis, sinusitis, perhaps otitis, that in the past have suffered many things of many doctors, too often to have been benefited little by any. It is shocking to think of the operations that have been performed on noses of little allergic children in the name of "sinus trouble" not to speak at all of the adult septums that have been straightened to a more or less architectural correctness, the repeated ethmoidectomies, the futile antrum punctures, window resections, and finally radical operations, many of which might have been dispensed with if a proper consideration had been given to the possibility of an allergy that rendered all such efforts nearly useless.

Of course, I am not to be understood as engaging in any wholesale condemnation of nasal surgery. I am only insisting that the possibility of allergy should always be borne in mind. I am even quite willing to admit that there are cases in which there might never have been any allergic manifestations if it had not been for pre-existing pathology that might have required surgical intervention for its cure. But I wonder if the reverse is not almost equally often the case, if hypertrophic rhinitis, posterior tip enlargement, polyposis, sinusitis, are not the result of long continued allergic manifestations which must be overcome before one can hope for a permanent cure. Hay fever, asthma, perennial rhinitis and so on are perhaps sometimes benefited, though almost certainly never cured by the straightening of a deflected septum, the removal of polypoid masses, the drainage of infected sinuses. On the other hand they are sometimes even made worse by any surgical interference. I suspect that the often unsuspected allergic basis for much nasal pathology is not infrequently the cause for the failure of much nasal surgery and consequently for the degree of discredit into which nasal surgery has fallen in these latter days.

I am not unmindful of the very frequent presence of a bacterial allergy. Naturally in such cases, one can hardly expect to cure the allergic manifestations until the bacterial foci are properly dealt with. Such bacterial sensitization often co-exists with other forms of protein sensitization. One may be engrafted upon the other and it may often be difficult to determine which is the primary form. Both must be treated, perhaps surgically, perhaps specifically, perhaps both. But the cure of either nearly always renders the management of the other less difficult.

It would not be possible now to enter in any detailed way into an account of the various ophthalmological and oto-laryngological conditions which might be, perhaps are, due to allergy. Our field of view in this regard is constantly enlarging. My own attention lately has been directed to the ear. I never examine an ear case now without a careful inquiry into the personal and family history from the standpoint of allergy and I hope that some day it will lead me to more definite opinions on the point. But why could not many of the acute exudative, recurring forms of mild so-called middle ear catarrh be nothing but the allergic transudation of fluids loaded with colloids, amino acids, urea, uric acid, creatine, through abnormally permeable capillaries? Why not indeed since the middle ear is nothing but a nasal sinus devoted to a special purpose and since we know that this is a very common, a very well known pathology in all these cavities? Why could not this result in a chronic condition of the mucous membrane analogous to what we find in the nose and sinuses, with a consequent progressive deafness? Why could not injury to the auditory nerve itself result from a similar transudation into the labyrinthine spaces? At least we know that migraine can certainly be sometimes explained on the supposition of such pathology and that the labyrinthine spaces are continuous with the spaces of the pia mater. I wonder if the ear is not a much more fruitful field for an application of all the before mentioned tests for allergy than we have hitherto imagined.

In England, Barber and Oriel have lately been doing some very interesting work. They have isolated from the urine of allergic individuals a

proteose-like substance which they believe to contain the specific antigen causing the manifestations or possibly secondary antigens or both. It is not possible now to do more than merely refer to this theory of secondary antigens. The experiments of Manwaring and others have done much to make it seem plausible. Secondary antigens are supposed to be produced mainly by the liver from the original antigen. Their presence—if they are present—may account for the frequent failure of attempts at desensitization by the original antigen. Barber and Oriel seem to have shown that the quantity of proteose in the urine is greatly increased during allergic attacks. They claim that allergic individuals very commonly give skin reactions to their own proteose and that normal individuals will become sensitized to this same proteose and will give skin reactions to it if they are injected with serum from the allergic individual from whom the proteose was obtained. Barber states that urinary proteose is not only specific but incredibly and inconveniently so and that it is capable of producing acute exacerbations of a given patient's symptoms in a dose of .1 c.c. of a one in one million dilution. Oriel states that "in specific food sensitization it has been possible to sensitize guinea pigs actively to the foods to which the patient was sensitized, using the urinary nitrogenous substance as the sensitizing agent." I can unfortunately not enter here into the details of the work done by these men and can only refer you for the present to their original articles.

I have, however, with my partner, Dr. J. S. Macnie, made some attempt to confirm the results of their experiments, though we commenced the work too late in the hay fever season of the present year to allow of our drawing any certain conclusions. Following meticulously the latest method outlined by Dr. Oriel, we obtained proteose from the urine of seventeen patients. Fifteen were cases of ragweed hay fever, one of urticaria. This latter case I had been treating for colds in the head. Several of these patients were confirmed asthmatics; one of them had developed asthma for the first time this season. In all the proteose was obtained during active allergic manifestations.

There was no difficulty about obtaining the proteose. In every case a substance was obtained giving the physical and chemical characteristics of the substance obtained by Oriel. But in not one case did we obtain a skin reaction that could fairly be called positive in the light of the control test. We did obtain erythemathous skin reactions in many cases but never a definite wheal, much less a wheal with pseudopods. This was true whether the test was made by the scratch method or intradermally and in every case both methods were tried. The results of the conjunctival test and of intra-nasal sprays were equally negative. In spite of these negative findings I used the substance therapeutically in seven cases. Far from noticing any such acute exacerbations of the patient's symptoms as mentioned by Barber even though the proteose is administered in such infinitesmal doses as .1 c.c. of one in a million dilution, I found not the least exacerbation even in doses of .3 c.c. of one in a thousand dilution.

There did appear to be some amelioration of the symptoms in several of the seven cases in which the substance was used therapeutically, a circumstance encouraging perhaps as far as it goes, but without broad enough empirical basis to be of any demonstrative value.

There have been other reports of failure to confirm the results of Barber and Oriel, though one can not deny the validity of their experiments, and indeed others have confirmed them in greater or lesser degree. The results they have obtained with Dale's test alone would almost seem conclusive. After sensitizing a guinea pig with the serum of an allergic patient, they suspend one horn of the animal's extirpated uterus in Ringer's solution. The addition of the same patient's proteose to the solution produces more or less violent contractions of the smooth muscle or the organ, which contractions can be recorded on a suitable apparatus. The contractions cease after all the antigen has combined with the antibodies in the uterine tissue. The fact that the contractions can be renewed by the addition of histamine to the solution shows that this cessation is not the result merely of exhaustion.

They have shown, furthermore, that if any particular skin area of a normal individual be passively sensitized by the injection of the serum of an allergic individual, this skin area will give positive reactions to the proteose of the patient, corresponding to the well known Prausnitz-Künstner reaction. Many other experiments, which cannot be here detailed, point to the specificity of proteose.

One wonders if the varying threshold of elimination of the kidney may not be responsible, to some extent, for the different results obtained by different observers. It is well known, of course, that this threshold of elimination does vary greatly even for the same substance in the case of different individuals and why not for proteose? Still it seems almost incredible that this fact could possibly explain the uniformly negative results in seventeen consecutive cases. It seems almost equally incredible that other observers should obtain positive results in such an extremely large percentage of their cases. I can only state that so far we, ourselves, have been unable to obtain the least proof of the specificity of proteose.

Naturally the proteose reaches the kidney through the blood and consequently it must be found in the blood. I don't know whether anyone has even looked for it there. I don't think, indeed, that a great deal is known about the exact composition of this proteose. It seems to be a product of protein cleavage or digestion, whether this cleavage takes place in the blood itself or the liver or other tissues. Professor Melli of the University of Rome has recently observed the presence of proteolytic ferment in the blood of asthmatic patients. Such considerations might suggest the possibility of using injections of autogenous blood serum or even whole blood as a therapeutic agent in certain allergic diseases. I know of no one having tried or even suggested it. Some encouragement of the idea might be found, however, in the fact that this very method is commonly resorted to now in the treatment of sympathetic ophthalmia, quite empirically but, as we all know, with distinct success, and there is more than a suspicion that sympathetic ophthalmia is itself, sometimes at least, an allergic manifestation. I hope to have something to say along these lines before another season rolls by.

I can only allude to the question of physical allergy. There is no longer doubt that there is such a thing as a changed Reactionsfähigheit to the action of such physical agents as heat, cold, light, etc., and we must not fail to relate this form of reaction capacity to pathological conditions in our field in cases where it really exists. We all know cases in which sneezing and other manifestations of an allergic form of rhinitis, of conjunctival irritation (perhaps I should here suggest vernal catarrh, so-called), of asthma, are produced by exposure to cold or light or heat. I will not mention urticaria, erythema, etc., since they are outside our field—except to illustrate my point. I know a woman who can not get out of bed in a cold room without the production of an immediate attack of asthma. Quite recently, I treated a young man, a very intelligent Filipino, for hay fever, who has always been unable to bathe in cold water without the breaking out of an urticarial rash. His mother was similarly afflicted. I am quite convinced that nearly all these cases are allergic from a much wider standpoint than the purely physical. Of the two I have mentioned—and I could mention many others—the former is sensitized to a wide variety of substances, including pollens, the latter is sensitized to pollens, at least, and probably to emanations of various kinds, of foods or both, though there has not yet been opportunity for making other tests.

SUMMARY

I have endeavored to clarify our idea of allergy by making of it a basic, probably inherited peculiarity of constitution which gives to the individual a greater than normal capability of sensitization.

I have drawn attention to certain differences between allergic phenomena in animals and in man which render their study in the latter more complicated and more difficult.

The problem of the diagnosis of the allergic state without reference to the particular antigen causing the manifestations has been discussed, it having been shown to rest upon: (1) a recognition and appreciation of the two underlying phenomena; (2) other manifestations of allergy; (3) a family history of allergy; (4) eosinophillia; (5) positive skin tests to one or some or many antigens.

The question of the uncertainty of specific diagnosis as opposed to the general diagnosis of a state of allergy by means of skin tests has been taken up and the difficulties of specific diagnosis by any method alluded to.

I have emphasized the certainty that many of the pathological conditions seen in the field of ophthalmology and oto-laryngology have an allergic basis and the probability that many more will ultimately be found to depend upon it and have suggested diseases which may, at present, be found in both categories.

I have dwelt at some length upon the consequent necessity of weighing well the question of allergy before resorting to surgery that all too often will be at least futile, perhaps injurious, without such a consideration of the pros and cons of the matter.

Bacterial allergy and the necessary lines of attack against it has been referred to.

The work of Barber and Oriel with urinary proteose has been very shortly dealt with and certain experiments of our own, made in an attempt to confirm their results, described. Some attempt—unsatisfactory it is true—has been made to account for the discrepancies in the results of different observers. It has been suggested that there may be some basis, both theoretical and experimental, for the use of autogenous blood injections in certain states of allergy.

Lastly, it has been shown that one should not overlook the possibility of physical allergy.

LOW BASAL METABOLIC RATES—A CLINICAL STUDY OF STATES OF LOWERED BASAL METABOLISM FOUND IN CONDITIONS OTHER THAN MYXEDEMA*

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SINCE one of us[8] studied a series of cases of low basal metabolism in 1928 there have appeared numerous reports in the literature concerning a wide variety of conditions with which a low basal metabolic rate has been associated. Some of these conditions we have recognized, while others we have not encountered. Therefore, we considered that a further study should be made of an additional number of cases. The first series comprised 510 cases occurring in the first 2,500 basal metabolic rate determinations done under the direction of the senior author. All but a few hundred of those determinations were done personally by the associate author. We have now completed over 5,000 tests, making an additional 2,500 available for comparative study. All of the tests in the second group have been done by one of us (B) personally. The first study concerned itself largely with an attempt to pick out what might be assumed to be a characteristic or typical symptom-complex. In our second study we largely confirmed these findings and added some other data. A good many of these tests were only single tests. All were done on ambulatory patients. Only such tests as were considered from our experience to be satisfactory, or which were checked by one or more repetitions, are included in the subsequent discussion. Some of the determinations made during the menstrual period are included because we are inclined to agree with those who think that the only factor during menstruation which is likely to affect the basal rate is that of pain,[13, 16, 32] and this would tend to elevate rather than decrease the rate.

No particular attention was paid to supposed premenstrual rise as noted by Benedict and Finn,[4] and McClendon.[25] On many of the patients numerous tests were made at greater or lesser intervals. These tests were always consistent with each other or with the therapeutic measures employed. We have persisted in using ± 10 as the limits of normal variation because that seems to be universal custom and we have found no good data upon which to base a change. DuBois[10] has reviewed the most recent studies in basal metabolism and advised adherence to the original criteria and conditions, and to these we have also adhered. The original Sage standards have more recently been confirmed and upheld by Booth and Sandiford[6] as being quite applicable to first tests done on ambulatory patients.

*From the Department of Medicine and Laboratories of the Nicollet Clinic. Abstracted for the Central Society for Clinical Research, Chicago, Illinois, November 4, 1932. Read before the Minnesota Society of Internal Medicine, Rochester, Minnesota, November 14, 1932.

To review in part the data derived from a study of the first 2,500 cases,[8] as a means of comparison with the second series, 510 were diagnosed as hypothyroidism and a symptom-complex was found in these 510 cases about as follows: Fatigue, weakness and drowsiness, goiter (28 per cent of these 510 cases), generalized pains and joint pains, constipation, overweight, nervousness (usually of depressive, apprehensive type), menstrual disturbances, sterility and frequent miscarriages. Such physical findings as anemia, low blood pressure and slow pulse were so variable as to be inconclusive.

Nothing but general impressions could be given of the results of therapy in this first series because of poor follow-up, the relatively large number of referred patients and the inclination of the clinician in charge to discontinue the therapy too soon if prompt results were not forthcoming. However, the impression was, that of those taking thyroid in adequate doses and for a considerable length of time, the majority were benefited, especially those who were overweight or those who had menstrual disturbances. There were a considerable number of patients who were not relieved of symptoms in spite of having the basal metabolic rate brought up to normal, and a less number who could not take enough thyroid to influence the basal metabolic rate without experiencing untoward symptoms; and finally, there were some individuals in whom the rate never could be brought to normal in spite of large doses of thyroid substance (6-10 gr. daily) and who showed neither relief of symptoms nor thyroid effect. For these various reasons, therefore, this study of individuals with basal metabolic rates of —10 or lower occurring in the second 2,500 consecutive determinations was made, with reference to the dominant symptoms, for purposes of classification of types if possible, the recognition of any unusual conditions, and to determine the effect of thyroid therapy.

In this second series, 489 cases were separated for study. These were all cases showing a basal metabolic rate of —10 or under in 2,500 consecutive cases. Patients diagnosed myxedema were not included. Therefore, these 498 cases may well be added to, or compared with, the 510 of the original report. After a careful analysis of these data we see no deviation from the symptom-complex previously noted (Table I). The outstanding complaint again is fatigue, weakness or drowsiness, then followed "generalized aches and pains," nervousness, stomach trouble and constipation, overweight, and menstrual difficulties.

TABLE I. SYMPTOM COMPLEX

1008 Cases

Fatigue
Weakness
Drowsiness
Generalized Pains
Joint Pains
Constipation
Nervousness (depression, apprehension)
Menstrual Disturbances
Sterility
Frequent Miscarriages
Overweight
Dry Skin
Falling out of Hair (occasional)

Various diagnoses were found assigned to these patients, usually in addition to that of a state of lowered metabolism, and these were tabulated. In most cases "hypothyroidism" was decided upon as the final, major condition by the clinician in charge, but in a good many it was considered to be the secondary condition. Table II shows the occurrence of associated diagnoses. No attempt was made in this study at correlation. If "hypothyroidism" occurred as a diagnosis at all, it was included for statistical reasons.

Most of the authors who have written on the subject of low basal metabolism have assumed or actually called the condition hypothyroidism. We had begun to suspect that there might be some other cause of the low metabolic rates in at least a certain group of these patients. This assumption may be borne out when we consider the large number of cases found to have some infection. Undoubtedly even a larger number of the total series likewise had something such as tonsillitis or cervicitis which did not find its way to the final diagnosis. At any rate, it becomes necessary to inquire into the influence of infection or metabolism. The large number of cases of menopause also raises the question as to what affects the basal metabolism during the climacteric. If, as many insist, there is no effect on the metabolism by any gland other than the thyroid, then there must be an associated thyroid effect at the menopause. These matters will be discussed more fully in considering the effect of thyroid therapy.

Boothby and Sandiford[7] and Means[28] have concluded that a rate of —10 or lower is a strong presumption of a hypothyroid function if other

glandular deficiencies and starvation states are ruled out.

The metabolic effect of various foods is well known, especially protein, and it is certain that some cases of low basal metabolic rates can be explained on the basis of insufficient or imperfectly balanced food intake. Perhaps the stimulating effects of certain vitamins should be considered, if not in respect to a direct effect on metabolism, at least with reference to indirect metabolic and growth influence.

TABLE II. ASSOCIATED DIAGNOSES
498 Cases

Infections: tonsillitis, sinusitis, prostatitis, cervicitis, bronchitis, pyelitis, etc. (usually multiple in any single case)	84
Menopause (either climacteric or postoperative)	80
Goiter (adenoma, non-toxic and colloid)	43
Obesity	42
Migraine	33
Psychoneurosis (usually anxiety type)	28
Post-thyroidectomy (not showing myxedema)	24
Chronic arthritis (probably in most cases not infectious)	24
Secondary anemia	23
Cholecystitis	18
Hypertension	15
Cardiac	14
Peptic ulcer	10
Glandular dystrophies	13
Urticaria and other skin lesions except acne	11
Lues	8
Fibroids	8
Colitis	6
Pregnancy	5
Achlorhydria	5
Rectal polyps, ulcers or hemorrhoids	5
Cystic ovary	4
Diabetes mellitus	3
Bronchial asthma	2
Salpingitis	2
Kidney stone	2
Pulmonary tuberculosis	2
Epilepsy	2
Encephalitis	1
Spina bifida	1
Glycosuria	1
Raynaud's disease	1

The total number of these diagnoses is 531. The discrepancy between that number and the number in our series (498) lies in the fact that on the one hand a good many diagnoses were multiple and on the other many cases had the single diagnosis of hypothydroidism.

A considerable proportion of our cases were described as undernourished, malnourished and underweight, and these patients were scattered throughout the whole series. Where thyroid substance was prescribed it very frequently stimulated appetite and seemed to help in bringing about a gain in weight.

Higgins,[15] Warfield,[40] Gordon,[12] Youmans and Rivens[42] have all reported series of cases with symptom-complexes quite similar to those reported here. Thommen,[37] McLester,[26] Lawrence[19] and Blumgarten[5] present patients with low basal metabolic rates without myxedema, but with symptoms comparable with all other groups reported, particularly from the nutritional standpoint. Cases reported by King,[17] Ohler and Ullian,[30] Barach and Draper,[1] Sturgis[36] and Dowden[9] have been referred to in our earlier paper.

Lee[22] reported cases of vasomotor rhinitis with low basal metabolic rates improved by thyroid medication. We have not had experience with this specific phenomena and could find no data bearing on it in this group of cases.

Koehler[18] reported cases called hyposuprarenalism and distinguished them from hypothyroidism, but we have not seen any cases we could definitely call such after hearing him deliver his paper. We have, however, occasionally found low rates in Addison's disease.

Constipation was one of the symptoms in our series but it is such a very common complaint in the general run of clinic patients that its importance is hard to evaluate.

Congenital hypothyroidism with achylia gastrica, chronic diarrhea, anemia of high color index and stomatitis described by Barker[2] has not been met with in our series although the occurrence of achylia and anemia separately or together was not at all unusual, and among true cases of myxedema one often meets cases closely simulating pernicious anemia.

Decreased function of the thyroid may show itself through mental symptoms and signs which obscure the actual cause of the disease. Rather marked anxiety and depressive states are frequent, but we have not seen cases as reported by Hayward and Woods[14] whose patients seem to have really had real myxedema. Most of these conditions were diagnosed by the clinician in charge as psychoneurosis, as noted in Table 2.

Familial hypothyroidism has been reported by Shelton,[34] but our records, although not accurately complete in this regard, do not show any such tendency and particularly not the relation to allergy which he mentions.

A particularly critical study is that of Thompson and Thompson[38] with reference to the effectiveness of thyroid medication. Their conclusions were that lowered basal metabolism without myxedema may result in: (1) those who are apparently healthy and normally have a low basal metabolic rate; (2) those with hypothyroidism

too mild to result in myxedema; and (3) those in whom a low metabolism is associated with pathological conditions other than under-function of the thyroid gland. They also recognize states of transient hypothyroidism and states secondary to nutritional, infectious and other factors.

TABLE III. NUMERICAL DATA—PRESENT SERIES

498 Cases

	Married	Single	Total
Male	59	25	84
Female	255	157	412
Total	316	182	498
Total cases on thyroid medication			176
No follow-up			63
Net			113
Improved			71
Not improved			42
Sterility cases on thyroid medication			29
No follow-up			11
Net			18
Failures			11
Successes			7
Threatened abortion on thyroid medication			5
Successful pregnancies			4

Combined Series

Sterility cases on thyroid medication	70
Failures	46
Successes	24

Of our series of 498 patients, 176 received thyroid medication. In sixty-three of these there were no notes as to the effect of treatment, or the period of treatment was too short. Therefore, a summary of results must be confined to 113 cases. Of these seventy-one were improved and forty-two were not improved (Table III). The average dosage was 1 to 3 gr. of desiccated thyroid substance daily, and the duration of treatment varied from two months to four years. In the patients treated over the longer periods of time the therapy was often intermittent. In some improvement was noted following the removal of certain supposed foci of infection during the administration of thyroid. To what the improvement was due, therefore, must remain uncertain. Also, some patients with low rates, to whom no thyroid was given, improved and the rates returned to normal after removal of infections. In many instances the improvement was concomitant with an elevation to normal of the rate, and symptoms returned and the rate fell in these same individuals when therapy was discontinued. It must be said also that improvement was noted in some in whom the rate was not influenced, and conversely there were those in whom it was possible to raise the rate without favorably affecting the complaint. These various analyses were made in individual cases but are not subject to simple charting. In general, as a comment upon previously quoted critics, our impression is that when and if the basal metabolic rate is raised and kept elevated to normal, improvement may be expected. However, enough thyroid must be administered continuously to maintain the level of metabolism at normal. Perhaps the most striking benefits were obtained in the cases of abnormal menstruation and the most discouraging in the cases of obesity.

In this connection Wilder[41] remarks that with diminished thyroid activity obesity might be expected since the rate of expenditure of energy is appreciably reduced in this condition. However, although increased weight is frequently seen in myxedema it is not obligatory and when it occurs it is largely due to accumulation of albuminous fluid and true fat is not much in evidence. In the absence of other unmistakable evidence of myxedema a rate higher than —20 does not justify the conclusion that the thyroid function is other than normal. If the energy metabolism of the obese subject is calculated with due regard to probable mass of muscle or active protoplasm it is seen to be elevated. The observations of Strang and Evans[35] have some bearing upon this point also. In one outstanding case of obesity, the patient did not lose a pound, nor was her basal metabolic rate elevated a single point on as much as 10 gr. of desiccated thyroid daily, although she was one of the sterility patients who became pregnant. Such paradoxical results are hard to explain and even lead to a certain skepticism concerning the whole matter.

The study of the sterility cases was especially interesting (Table III). Twenty-nine females were studied particularly with reference to the possible thyroid effect, that is, were found to have low basal metabolic rates, no other cause for sterility and with whom the male partner was potentially fertile. Results which we assume to be due to the thyroid substance, *i.e.*, pregnancy resulting at an interval after institution of therapy which seemed consistent, occurred in seven cases. Eleven patients had no adequate follow-up. In eleven cases, no pregnancies resulted during what seemed to be an adequate period of time and in two cases the outcome is still in doubt. These results are in addition to those previously re-

ported by Litzenberg and Carey[23] of fifty-two sterile patients with low basal metabolic rate treated with thyroid, one-third of which became pregnant. By adding cases from the present series, twenty-four pregnancies resulted in seventy cases.

In addition, five patients with threatened abortion or in whom abortions had occurred in previous pregnancies, and in whom low rates were found, received thyroid extract and four successful pregnancies resulted. All of these cases are included in the total previously given as improved. The only comparable results are those reported by Ehinger,[11] in whose cases, however, no basal metabolic rate determinations were done. Lacking effective ovarian therapy for sterility, at least these results are in line with suggestions of Rowe[33] that sterility is highest in those showing ovarian disorders, next highest in thyroid deficiency and lowest in pituitary, but that in a non-endocrine group of patients, infertility is definitely less frequent. Meaker,[27] reporting from the Evans Memorial, found that 80 per cent of sterile women had some sort of endocrine dysfunction.

In our previous study we noted especially 137 women, seventy-eight of whom were married, and 56 per cent of the latter sterile. Our present series reveals a percentage of 47.9 of sterility in 255 married females (Table IV). In addition, 1.8 per cent of this number had abnormal pregnancies which resulted in miscarriages, abortions or stillbirths, so that the percentage of actual sterility would be 49.7 per cent, which is considerably greater than that of sterility in the general white female population of the United States (13 per cent).[24]

TABLE IV. NUMERICAL DATA—STERILITY AND MENSTRUAL DISTURBANCES

	Cases	Sterile Per Cent.	Menst. Disturb.
Present series (married females)	255	49.7	
Combined series		52.8	
Present series (menopause excluded)	332		33.5
Combined series			39.7

In our previous series 44 per cent of the total number of females had menstrual difficulties of some order, amenorrhea, menorrhagia, or metrorrhagia. In our present series of 412 females these abnormalities were noted in 28.6 per cent (Table IV). The rather wide discrepancy in this figure is unexplained except that the total number is larger and perhaps many cases are included in which no specific data concerning menstruation was noted, which cases should have been more carefully excluded. Also, the cases of menopause should be discarded from this series. A revision of these figures gives 118 abnormal cases in 332 women, or 35.5 per cent, an average of the two series of 39.7 per cent in 469 cases.

Toronczyk[39] discusses menstrual disorders from the standpoint of thyroid dysfunction and claimed excellent results in twelve treated cases. E. Novak[29] thinks that the most common causes of amenorrhea are ovarian, pituitary and thyroid in the order named, but recognizes that effective therapy can only be had through the use of thyroid extract. Lawrence[20] is inclined to place major emphasis upon anterior pituitary deficiency and claims results with 20 to 60 grs. of anterior pituitary substance. He also ascribes some importance to focal infections and protein deficiencies in the diet. Our own results have been more in accord with those of Novak, in that we have been disappointed in the use of ovarian or pituitary extracts but have found thyroid substance effective in certain cases.

Lawrence and Rowe[21] call attention to occasional cases of migraine which are really hypothyroid. In our series we think that there is more than an occasional case. Headache was a very common symptom and in thirty-three instances was diagnosed as definite migraine. Some of these patients derived benefit from thyroid therapy, although the most of them received none. Here again the clinicians seemed to fear giving thyroid in such a condition in spite of the indication of a low rate.

A few patients had symptoms of urinary frequency as Beck[3] has reported and these also were benefited by thyroid therapy. In fact, the urological department is now routinely requesting a basal metabolic rate in cases of frequency not explicable upon organic grounds.

Of the twenty-four patients with arthritis included in this study by far the greater number who received thyroid therapy responded favorably. It is impossible to accurately evaluate these results inasmuch as other procedures were carried out at the same time, such as diet regulation (Pemberton),[31] weight reduction, removal of foci of infection, etc. We have the impres-

sion, however, that basal metabolic rate determinations should be made in all cases of degenerative (hypertrophic) osteoarthritis, particularly those occurring at or after the menopause in females, and that thyroid therapy is of benefit in those found with a low rate.

CONCLUSIONS

Certain general impressions may be had from personal experiences with much of this material, and from a careful study of it all.

1. That patients presenting certain symptoms of fatigue, general bodily aches and pains and apprehensive anxiety states should have basal metabolic rate determinations.

2. That it may be helpful as a guide to therapy in certain post-infectious states and at the menopause.

3. That such determinations should be made as a part of a study of male or female sterility when no organic or functional cause is found.

4. That such study should be made in all females suffering from menstrual abnormalities not explained on an organic basis.

5. That cases of habitual abnormal pregnancy should likewise be so studied.

Our impressions go further, to the extent that whenever in any of the above mentioned conditions a low basal metabolic rate is found, thyroid substance should be administered to an extent and for as long as seems sufficient to raise the rate to normal and maintain it there. It should be discontinued only if not tolerated, or after a sufficient length of time has elapsed so that it can be certainly declared ineffective. Our percentage of improvement in treated cases with adequate follow-up (62.8 per cent) supports this belief, which is further buttressed by the results in the treatment of sterility and threatened abortion. Finally, we are not yet prepared to designate these conditions definitely as hypothyroidism, but prefer, pending further study and experimentation, to call them simply states or conditions of lowered metabolism.

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REMARKS ON CERTAIN SPECIAL METHODS OF ANESTHESIA*

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SACRAL block is a very useful method of anesthesia. It will result in anesthesia and paralysis in the distribution of the sacral nerves, so that when it can be used it is superior to any form of local or regional anesthesia, or to general anesthesia, for operations on the anus.

Sacral block has been used in The Mayo Clinic since 1920. From July 1, 1924, to July 1, 1932, it was used in 7,134 cases. There have been practically no untoward results from its use when it has been properly carried out. There are fewer untoward results with sacral block than with the spinal anesthesia. Sacral block does not cause postoperative headache. I have never seen symptoms of meningitis following this technic. Relaxation is good, anesthesia is good, and breathing is quiet. Operating conditions are very favorable.

Preliminary medication is advisable. Some barbiturate, such as pentobarbital sodium (also called membutal) or sodium iso-amylethyl barbiturate (sodium amytal) should be used. I think their use is of advantage before sacral block because a barbiturate is an excellent antispasmodic and procaine is a convulsant when injected into the blood stream in sufficient amount. I have seen one patient go into convulsions after 3 c.c. of 1 per cent procaine had been injected into the caudal canal. The barbiturates, in addition, eliminate fear and apprehension, and a patient who is not excited and is not nervous on coming to the operating room is usually much more easily handled, and is much more pleased about the way he has been handled, than is a nervous patient.

The technic of sacral block has been described elsewhere by me.[2] It gives anesthesia for operations on the perineum and genital organs, on the uterine cervix but not the fundus, and on the rectum but not the peritoneum. It can be used in operative obstetrics but ordinarily is not

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used in normal labor. In operative obstetrics it is possible under sacral block, to do manual dilatation of the cervix, delivery by high forceps, episiotomy and repair after episiotomy.

Anesthesia appears about thirty minutes after injection of the caudal canal, but is not always bilaterally equal. The effect lasts for from one hour to an hour and a quarter, depending on the amount and concentration of the solution. There is not always as much relaxation with 1 per cent as with 2 per cent solution of procaine. We have not advocated the use of 2 per cent solution, however, and prefer to do sacral block with 1 per cent solution, which produces anesthesia in fifteen minutes, lasting from an hour and a half to two hours.

A block useful in many cases is effected by injection of the caudal canal and second sacral foramen on each side. With this block, anesthesia appears in about twenty minutes and lasts about an hour and a half. The solution should be injected at about body temperature, because cold solutions seem to produce anesthesia less quickly. The technic of blocking the sacral nerves is not as difficult to learn as is commonly thought. Its usefulness warrants the effort required to master it.

SPINAL ANESTHESIA

A technic of spinal anesthesia has been described elsewhere by Tovell.[7] Procaine is the best drug as yet available for inducing spinal anesthesia. It may be used in 10 per cent solution, or it may be used by the more universal and standard method of dissolving the crystals in spinal fluid. Its effect sometimes is not of sufficient duration, but it is seldom that some general anesthetic is entirely contraindicated; therefore, if the spinal anesthesia does not last long enough, or if it does not extend sufficiently high for the operation, supplementary general anesthesia may be employed. In many cases I have found it better to give a known safe dose of procaine intraspinally, and to supplement this effect with a gas or a gas and ether, as has been described elsewhere by me,[3] than to give a dose of procaine large enough to permit the operation to be performed under spinal anesthesia alone. In connection with spinal anesthesia one should avoid deep anesthesia by drop ether, because of the increased frequency of postoperative pulmonary complications following use of this combination of agents. When one must use spinal anesthesia only and must produce prolonged anesthesia, pantocain may be used alone or mixed with procaine.

The untoward results incident to the use of anesthetics given intraspinally have been investigated for a long time. Certain untoward effects of stovaine have been described by Spielmeyer,[5, 6] who has reported on the cellular changes in the spinal cord and on the changes in the myelin of the posterior columns. Early congestive changes produced by nupercaine and other spinal anesthetics have been described by Davis, Haven, Givens and Emmett. Permanent changes in the periphery of the spinal cord only (anterolateral and posterior columns) without cellular changes, and seen only in the experimental animal and not clinically, have been investigated by Essex, Kernohan and me, and are to be reported soon. The results of a study by Emmett on the differential effect of varying doses of procaine on several parts of the nervous system, together with clinical and experimental data, lead me to believe that in giving a spinal anesthetic one should bear in mind the number of cubic centimeters and the concentration of the solution as it leaves the syringe, as well as the dose and the rate and site of injection. For example, the effect produced by 150 mg. of procaine injected in 3 c.c. of solution tends to last longer than 150 mg. of procaine in 5 c.c. of solution. For the average person I find that a dose of 1 mg. for each pound (0.5 kg.) of body weight, not to exceed about 200 mg. for the average patient, would be a relatively safe dose, although debility would reduce the dose by 25 per cent or more, and outstanding robustness might indicate the safety of 1.25 to 1.5 mg. for each pound of body weight, up to 250 mg. I think that solutions should not be injected in concentrations of 10 per cent or stronger, and for ordinary work the solution leaves the syringe in a concentration of 3, 4, or 5 per cent. When a safe dose has been decided on, and the concentration of the solution to be injected has been decided on, then one can determine the point at which the injection should be made. The rate of injection should be about 0.5 c.c. each second for the purposes of uniformity, and without barbotage, except for aspiration of 0.5 c.c. of spinal fluid to determine if the spinal needle is still subdural at the end of injection.

The use of ephedrine has made spinal anesthesia somewhat safer, and has widened its ac-

ceptance. Certain unusual effects of this drug sometimes can be noted. A most interesting effect in some cases is excess stimulation of the circulation. This is accompanied by rise in blood pressure, followed by shortening or absence of spinal anesthesia, an unsatisfactory result from gas or gas and ether anesthesia, and difficulty in producing relaxation with drop ether anesthesia until the period of activity of ephedrine has elapsed. Such an effect may follow the use of a small dose, such as 25 mg. of ephedrine. This effect calls attention to the fact that the best method of using ephedrine has not yet been described.

The patient may expire while under the effect of the spinal anesthetic from any cause from which he might ordinarily expire, such as cardiac failure. However, the immediate accident that may terminate fatally is intercostal paralysis, followed by paralysis of the diaphragm, with extreme anoxemia and cardiac inhibition. It is possible in some cases, by artificial respiration and massage of the heart, to restore the patient and his physical functions, but if anoxemia has been prolonged, especially with cardiac function impaired or abolished for about four minutes, death may ensue immediately, or about thirty-six hours later, without a return to consciousness, although the pulse rate, blood pressure, and respiration may appear to be normal. One must, therefore, avoid this anoxemia, the onset of which is insidious and gradual. The administration of oxygen, with or without carbon dioxide, is of great importance when the blood pressure is falling, and especially so when respiration is inadequate. In certain cases one may use forced insufflation of oxygen by means of the gas machine, using only a face mask, and usually, in twelve to twenty minutes, respiration returns spontaneously. If recovery is delayed longer than this, the outcome is very grave.

When respiration ceases entirely, whether from spinal anesthesia or from any other cause, the most efficient method of supplying artificial respiration during operation is to introduce an intratracheal tube and use a pulmonary ventilator. This technic has been described elsewhere by me.[4]

From January 1, 1927, to July 1, 1932, spinal anesthesia has been used 7,891 times at The Mayo Clinic, and I have been impressed with the advantage of a uniform technic, including a dose estimated on weight of the patient, debility, risk, suitable site for injection, predetermined concentration of the solution, and a fixed rate of injection.

INTRATRACHEAL ANESTHESIA

Magill's method of intratracheal anesthesia differs from the older methods essentially in that he uses a soft rubber tube with a large lumen through which the patient breathes and through which the anesthetic may be inhaled or insufflated. The method of passing the greased tube through the nose, after the throat and larynx have been sprayed with a surface anesthetic and the patient has been anesthetized with a general anesthetic, is described by him as blind intubation, and if the tube cannot be successfully passed in this way, the laryngoscope may be used and the tube passed either through the nose or mouth, under direct vision.

During maintenance one follows the patient's condition and the depth of anesthesia partly by watching the activity of the breathing bag. Also, the color of the patient may be determined by comparison of the anesthetist's fingernail with that of either the patient's fingernail or toenail, or by watching the color of the ear, the lips, or the blood in the wound.

Preliminary medication for the average adult patient usually consists of 1.5 grain (0.1 gm.) of pentobarbital sodium the night before operation and 1.5 grain an hour before operation the next morning, together with morphine 1/6 grain (0.01 gm.) and atropine 1/150 grain (0.0004 gm.).

Intratracheal anesthesia is essential in operations on the lung, and is advantageous for diaphragmatic hernia, plastic operations on the face, operations on the eye, or operations on the neck. It is employed to advantage when a general anesthetic is being used and the respiratory passage is not free and patent, and in operations on the brain when it is anticipated that the patient may stop breathing, or in any case in which respiration stops for many minutes or hours. Insertion of the intratracheal tube facilitates artificial respiration either by the manual method, with the gas machine, or with the pulmonary ventilator.

I think Magill's method will become widely used because it facilitates both administration of a general anesthetic and ventilation of the patient, and because it quiets respiration and facili-

tates relaxation, and, therefore, gives flexibility in controlling the patient while he is anesthetized.

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INTUSSUSCEPTION*

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I HAVE assumed that an experience of some four score cases of intussusception might furnish material for an interesting presentation. It is not undertaken in the form of a comprehensive review of case records with statistical data, but rather to emphasize features of the disorder as seen by the pediatrician, especially as an aid to early diagnosis. For a fine statistical analysis of 1,028 cases including the series of Gibson, Wichman, Lichtenstein, Clubbe and others, I would refer you to the paper by Hess,[3] published in the Archives of Pediatrics in 1905.

One of the outstanding features of intussusception is that of age incidence. It is primarily a disease of infancy, some two-thirds of all cases occurring in the first year of life. A few cases are seen in later childhood, but it is rare after puberty. The matter of age then introduces certain problems of diagnosis and aspects of its surgical treatment. Description of subjective symptoms and coöperation in the physical examination cannot be called upon in the infant. Surgically, the patient six to twelve months of age, certainly presents peculiar anatomical, physiological, and immunological problems.

The etiology of intussusception is still rather obscure. Why should the condition be so definitely limited to infancy and why should one child meet with this adventure and others escape? Some of the theories advanced are as follows:

1. A mobile gut and as a corollary a long mesentery. This is probably an important factor. Kock and Oerum[5] found a freely movable, or "floating cecum," to be present in 42 per cent of infants and in only 17 per cent of older children.

2. The presence of some tumor mass, such as a diverticulum, mucus cyst, enlarged mesenteric glands. But in the majority of cases, such tumors are absent, while conversely these tumors are frequently found at operation in later life in individuals who have escaped intussusception.

3. Keen,[4] in discussing etiology, calls attention to the discrepancy in size of the large and small bowel, which at birth are equal, while at five years the colon is two to three and a half times as large as the small bowel. Were this a causative factor, intussusception should be more frequent in later life, which is contrary to experience.

I believe that some disturbance of innervation, anatomical or functional, combined with a floating cecum, best explains the etiology of intussusception. Irregular, incoördinated nervous impulses lead to a contracted segment of the gut in proximity to relaxed gut and a slipping or telescoping results. The condition is analogous to colic. Though the entity of colic has been denied by such eminent pediatricians as Sedgwick, nevertheless some babies are restless and suffer

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greatly from spasmodic abdominal distress, while others are calm and peaceful in the early months of life. Whoever has observed such a restless infant must have been impressed with the manifestation of a severe spasm of pain, which is instantly relieved by the relaxation of a segment of bowel with palpatory and audible evidence of the passage of gas through the bowel. It is conceivable that in severe cases of colic, partial, incomplete intussusception occurs. Senn,[7] in his work with cats, could produce intussusception by mechanically tucking the bowel inside itself. Further, he found that when the invaginated bowel was sutured in place, the gut made strenuous efforts to reduce itself and thus produce spontaneous recovery. This tallies with the experience which clinicians have had in that the tumor has not been found at operation, even when the history, physical findings and x-ray evidence have definitely pointed to a classical intussusception.

It is my belief that intussusception is a very frequent occurrence in infancy, that the majority are self reduced, and that only certain types in which nature fails to work out a speedy correction reach us as surgical problems. These latter cases show a tightly invaginated gut with constriction and circulatory disturbances such that spontaneous reduction cannot occur and an initial shock so characteristic of the disorder follows. Again the depth and duration of shock, as a rule, is a measure of operative findings. In case of mild symptoms of shock, time is not so important an element and the tumor is easily reduced. Conversely, with profound, persistent shock, one should expect to have difficulty in reducing the bowel and after lapse of a very short period of time the gut will be found edematous with evidence of beginning gangrene.

The pathology we need not discuss at length. As you know, the progress of the tumor is from above downward in distinction to the reverse in the terminal or agonal form. The location of the tumor we know to be variable, dependent upon the section of the bowel involved and the duration of the symptoms. A definite classification on the basis of the site of the invagination is largely academic, though it is true that the prevailing type in the first year of life is ileocecal. The important consideration is the early diagnosis of intussusception, irrespective of its site. Further, to the best of my knowledge, the symptoms are the same, regardless of the location. Perhaps what is not usually recognized is the frequent occurrence of double intussusception, that is, an intussusception section of gut may again invaginate bowel; even a triple formation may occur. Naturally such complex formations may greatly increase the difficulties of reduction. Multiple intussusception at different levels of the gut have been described, but fortunately are rare.

Symptomatology.—My excuse for again presenting an old topic is to simplify the early diagnosis through a wider knowledge of symptoms and signs. I feel there is ample justification for the effort because too many infants die each year from unrecognized intussusception or too tardy recognition. Then, too, the average text book gives as criteria for the diagnosis a group of findings which too often signify a late diagnosis and consequent doom of the infant. My first case in private practice was one of intussusception. Luckily I stumbled onto an early diagnosis and advised operation. But callowness of youth weighed against my opinion and the parents sought relief through the castor oil bottle rather than the surgery recommended. When too late to offer hope, the surgeon rightly refused operation. I followed this case through to exitus on the eighth day. Later my interest was further stimulated by association with Dr. A. W. Abbott. Together we observed a group of cases, many of them for some hours before operation, if there was little shock present. The time was spent in a close scrutiny of the child, observing the character, duration, and interval of pain; palpating of the abdomen during pains and during the free interval; checking palpatory with fluoroscopic findings; and especially noting the facial expression, outcry, and posture assumed by the little patient. Dr. Abbott[1] presented these observations before the Western Surgical Association in 1915. It was a fine clinical study of intussusception. Much I have to say may prove repetition, but if repetition may help save babies' lives I trust you will bear with it.

I believe in the great majority of cases of intussusception the early symptoms are so simple and clear cut that a novice can recognize them. I have made the diagnosis in several instances from the description given in telephone conversation. To disarm the charge of egotism, may I state that two mothers have made the diagnosis.

In one instance the child had a recurrence some months after operation. She did not call us to the home but brought the child directly to the hospital, as she stated, for another operation for intussusception. In another instance, a second child in the same family having intussusception, the mother called us for confirmation of her diagnosis before summoning a surgeon.

What then is this clinical picture? Briefly it is as follows: A well nourished (usually breast fed) normally developing child is suddenly and without warning seized with pain. It cries out, grows pale, perspires freely and goes into collapse or shock. This state lasts seconds or minutes, passes off completely and the child appears normal, may even resume play. The mother is greatly alarmed for a time, but as a rule the child's apparent speedy and complete recovery removes her fears and rarely is the physician called at this time. However, after a variable time (two to thirty minutes) the child again shows evidence of pains and, provided it is old enough to turn over, it will assume the knee-chest position in bed or on the floor. Frequently during the pain it will strain as in defecation. This phase may again last for seconds or minutes, pass off and the child again may resume play. This cycle will be oft repeated. The most striking analogy is that of labor pains. There may be periods of minutes or an hour or so free from distress, then a return of pain. The giving of food will usually cause a return of pain and an increase in its intensity. This cycle of outcry, pain with accompanying posture, I think is the most striking feature of intussusception and not to be confused with that of any other disease. Now other symptoms may appear. Shortly after onset, there is vomiting and about the same time passage of a normal appearing stool. Vomiting may or may not be repeated. Recurring vomiting is not a necessary part of the picture. Hyperactive peristaltic action of the bowels produces further evacuations, showing important evidence, namely, blood stained mucus with little or no fecal matter. This, added to the other symptoms, usually alarms the mother and at this stage the physician usually is called. This is the critical time in the story. The physician who obtains a true history of the onset and will take time to observe his patient for a brief period, will make the diagnosis. Too often, however, the condition is considered some form of enteritis and castor oil or other cathartic is given with disastrous results. At this stage the temperature and white count will be found to be normal. Palpation of the abdomen often fails to elicit a tumor. During paroxysms of pain the abdominal muscles are tense and the child resents examination, while during the interval of freedom from pain the entire gut relaxes and the mass may not be demonstrable. The definite, hard, sausage shaped tumor is usually a late symptom. The same may be said of detection of a tumor by rectal examination. It is poor medical teaching to emphasize the findings of a rectal tumor. The diagnosis should be made hours or days before such a tumor becomes palpable per rectum. However, rectal examination may be very helpful if on the examining finger mucus tinged with blood appears. Shelley[8] asserts that with bimanual palpation, one hand over the abdomen, a finger in the rectum, and the child held in the sitting position, a sensation similar to ballottement may be obtained. Fluoroscopic examination may help confirm the presence of tumor by a line of demarkation of a gas-filled bowel above the obstruction and the absence of gas in the collapsed bowel below. Or one may give a barium enema which may determine a level of obstruction provided it is below the ileo-cecal valve.

The majority of cases are as typical as described. However, there are two variants. First, the very acute, fulminant type in which the infant goes into shock and does not come out. In such a case the cycles of pain are not as apparent and the infant does not assume the striking, typical posture. In these cases one will find the gut tightly invaginated, the circulation cut off, with consequent edema and gangrene in surprisingly short time. Secondly, the chronic type. In these cases there is a typical abrupt onset but with little shock, the pains are not as typical or severe, obstruction of the bowel is not complete, so that gas and some fecal matter may be passed. Further, there may follow periods of days when the child appears normal and then symptoms will return in a mild form. We followed such a case for two weeks. Dr. Abbott eventually operated, found a large tumor, which, strange to say, was easily reduced at that late date and the patient made a speedy recovery. Lichtenstein reports a case of eleven years duration. As you know, some chronic cases have worked out a spontaneous cure by sloughing of the invaginated gut,

but needless to say delay with this in prospect is not good treatment.

In summation, it is my contention that the early diagnosis of intussuception is to be made from the history and careful observation of the patient; that the typical text-book picture is an eleventh hour finding. Further, though it may be open to question because of the element of fear introduced, I feel an intelligent mother could be instructed to recognize intussusception when it occurs.

Now as to treatment. It should be surgical. The report of 400 cases by the Danish observers, Kock and Oerum, in which treatment by injection or the "bloodless method" was employed, is instructive. The bloodless method consists of anesthesia by chloroform plus taxis plus the injection of 500 to 1,000 c.c. of water into the lower bowel. In their age group under one year, their mortality rate for the bloodless method was 35 per cent and their operative mortality was 74 per cent. Surgery was usually called upon after failure of the bloodless method. It is my feeling that the mortality rate for both methods is disgracefully high. We have had a few cases, seen soon after the onset of suggestive symptoms, in which the diagnosis was not certain, in which we have employed the injection of barium with low pressure. Under the fluoroscope the barium proceeds through the colon by fits and starts, due doubtless to spasm of the bowel, so that it is extremely hard to determine whether an obstruction has existed or not. However, in a case of intussusception of many hours duration and certainly where a definite tumor can be palpated, I shall never treat by injection of air, water, barium or any other substance. It is unthinkable that such measures will reduce an advanced case with an edematous gut, beginning gangrene and especially the compound variety, with as great safety as surgery offers. The temptation is great to use dangerous pressure. Mortimer[6] found that a pressure of five feet of water was sufficient to stretch the peritoneum to the cracking point and cause rupture.

There is still another portent with the blind reduction by injection or inflation. The appendix may become involved in the mass in such a manner as to cut off its circulation. Even with successful reduction of the intussusception a gangrenous appendix may cause subsequent peritonitis. So, with a well confirmed diagnosis of intussuception I shall always employ operation.

Then, too, there remains the fear of incomplete reduction or recurrence. I feel that the best insurance against recurrence are the post-operative adhesions. In spite of the protective adhesions recurrences are encountered. One occurred in my series. Cohen[2] reports forty-four operations for intussusception in twenty-one patients, two patients having been operated upon three times.

Never having opened an abdomen it may be heresy for me to discuss surgical treatment. Nevertheless, after the surgeon has made his dramatic attack, often the pediatrician is left to hold the fort, to inform the parents disaster is imminent or to help soothe their troubled souls after the demise of the patient. So, during the years I have made certain observations. These I reported some years ago, but will briefly recapitulate.

1. Restore the water balance of the infant as quickly as possible.
2. Prevent loss of body heat to lessen shock.
3. Avoid loss of blood to prevent shock.
4. Give as little anesthetic as possible; the margin of safety is very narrow in the infant.
5. After operation give food as soon as possible and in generous amounts; the infant stands starvation badly.
6. Isolate the patient as completely as possible. The infant possesses little if any immunity and a complicating upper respiratory infection usually results in a fatality.

I have also made some observations on surgical technic and ask your indulgence in stating them.

1. Reduce the intussusception and terminate the operation as soon as possible. Unless the circulation of the appendix is greatly impaired and gangrene threatens, leave it alone. Often sudden death in the period twelve to twenty-four hours after operation, when the patient appears to be doing nicely, is due to thrombosis of mesenteric vessels and subsequent embolism. The less trauma the less the opportunity for this unfortunate result.
2. In infants under one year, we have never had a case of resection of the bowel recover. Some other technic should be employed. Of course, best of all is an early diagnosis with prompt treatment and the avoidance of gangrene.
3. In three cases of intussusception, we have seen evisceration following the bursting open of

the abdominal wound, in each instance no retention sutures having been inserted. In the infant either the sense of pain is less or the absence of fear is such that you cannot expect it to long remain quiet in the prone posture. If old enough and not persistently restrained, it may be walking around the crib soon after operation. Certainly painstaking closure of the wound and the best retention possible should be employed.

I have tried to paint a clinical picture of intussusception to aid in its early diagnosis. Too many cases are still overlooked or recognized too late. Since it is largely a disease of infancy, I have tried to outline a program under which, we have found from experience, convalescence is smoother, speedier and more assured.

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FATAL POSTOPERATIVE PULMONARY EMBOLISM*

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PULMONARY embolus is one of the most serious and most dreaded of all postoperative complications. It usually occurs as a surprise to the surgeon and little or nothing can be done in the way of treatment because of the rapidly fatal termination. Besides being a shock to the physician it is a calamity to the relatives because it occurs during convalescence some days after the patient has successfully weathered the surgical procedure. There is no need to describe the clinical picture, as it is doubtless familiar to all, and no one need strain his memory to recall some outstanding case that terminated fatally from this most dramatic of maladies.

REVIEW OF THE LITERATURE

The incidence of fatal pulmonary emboli as given by various writers is shown in Table 1. Most authors give the average age of its occurrence as more than fifty years. Rehn[40] gave the average age as fifty-five and six-tenths years and Henderson[19] as fifty-three and two-tenths years. Apparently the danger is increased by age as the literature stresses the extraordinarily low incidence of pulmonary embolus in young persons. However, there is a recent report by Jones[23] of a pulmonary embolism in an infant seven months of age which followed mastoidectomy for aural infection. Necropsy showed a long rounded embolus in the pulmonary artery.

Sex does not appear to be a factor although Popper[38] and Rehn[40] stated that it occurred more often in women.

The following contributory factors have been gathered from the literature, based on the conclusions of numerous authors.

1. Meteorologic factors seemed to be involved in thirty-five cases studied by Fritzche.[14] Owen[35] stated the belief that the incidence varied directly with the prevalence of influenza and, therefore, seasonal occurrence was suggested.

2. Slowing of the circulation from mechanical means according to Welsh,[48] Bancroft and Stanley-Brown,[3] or from myocardial degeneration as shown by Lemon and Willius[27] in that myocardial injury was found in 42 per cent of cases of fatal pulmonary embolism, has been suggested.

3. Injury to the walls of the vessels and en-

*From the Arrowhead Clinic, Duluth.

TABLE I. INCIDENCE OF FATAL PULMONARY EMBOLISM AS GIVEN BY VARIOUS AUTHORS

Investigator	Cases studied	Percentage of post-operative deaths	Percentage death in all operative cases	Comment on deaths from pulmonary embolism
Dahl-Iversen and Ramberg	18,168*			636 cases of phlebitis, thrombosis and embolism which does not represent an increase
Detering				Fivefold increase
Dornrich				Increase of 3 to 4 times since 1924
Spiegel and Farr	1,116 necropsies		2.68	30 fatal emboli
Giessendorfer				Not on the increase
Gruber				Increase from 0.68 to 3.46 per cent
Henderson (Mayo Clinic)		6		
Hosoi	64		0.09	0.08 per cent of all gynecologic cases
Killian (Freiburg Clinic)		1		
Prochnow	12,777 prewar		0.13	
	17,531 postwar		0.12	
Schmidt (University of Breslau)	6,114**		0.42	
	10,297***		0.05	
Snell (Mayo Clinic)		8 to 10	0.2	
Sluger and Bozsin				
Walters (Mayo Clinic)	63,347†		0.32	Enormous increase in recent years
				267 fatal emboli

*Operative cases. **Gynecologic operations. ***Obstetrical cases. †Major operations.

dothelium seems to be a factor. Phlebitis has been of dangerous significance in the reports of Joel.[22] However, Brown[7] studied eighty-seven cases of postoperative phlebitis without encountering one complicating pulmonary embolism. Thomas and Alyea[45] reported thrombophlebitis as rarely yielding fatal embolism as the embolus is usually dislodged before phlebitis is recognized clinically. Bernheim,[4] and Hampton and Wharton[18] reported a low incidence of grave pulmonary embolism after phlebitis but a high incidence of pulmonary infarction. Varicose veins are of little, if any, significance.

4. Dehydration causes an increase in viscosity of the blood according to Miller and Rogers.[32]

5. Changes in the consistency of blood seem to be a factor. In Allen's work[2] the erythrocytes, leukocytes, prothrombin time, fibrinogen and lipoids show definite and constant changes after operation.

6. Diaz Sarasola[11] believed the essential factor to be a predisposition to the formation of thrombosis or a condition of latent thrombophilia. Rehn described the "embolic habitus."

7. Postoperative infections were common in Henderson's series[19] of fatal emboli.

8. Schmidt[42] gave poor general condition and reduced resistance as the decisive factors in embolic fatalities. Sixty-seven per cent of Killian's cases[24] had an unfavorable prognosis preceding fatal embolism. Dornrich[12] and Diaz Sarasola[11] stated that there was an increased frequency of embolism in cases of malignant tumors.

9. According to Henderson[19] there is no great difference in the number of deaths from pulmonary embolism following operations on the upper and lower abdomen. Miller and Rogers[32] and Giessendorfer[15] stated the belief that it may follow any operation on any organ but that it is rare following appendectomy. Prochnow[39] found

that emboli followed, in order of frequency, operations for abdominal hernia, uterine myoma, ileus and carcinoma of the stomach.

10. That chronic poisoning from exhaust gases of automobiles caused disposition to thrombosis and embolism was suggested by Knutzen's experiments.[26]

11. Obesity increased liability to embolism as shown by Snell.[43]

12. Traumatization of fat has been considered a factor for, if emulsified fat is injected intravenously or intraperitoneally, the blood clotting time is shortened.

13. Miscellaneous factors such as reduced diaphragmatic respiration, normal or subnormal blood pressure and intestinal stasis are thought to play a part.

Intravenous therapy has no apparent relation to pulmonary embolism in the opinion of Killian,[24] Giessendorfer,[15] and Adolph and Hopmann.[1]

In summary of these factors Hueck[21] stated that investigators have been unable to ascribe the process to any single factor.

From the literature embolism occurs usually about ten days after operation. It is now generally agreed that the source of the embolism is the veins of the lower part of the body such as the iliac, femoral, hypogastric and pelvic or prostatic vein and not those in the surgical field. The left femoral vein is by far most commonly responsible.

The cause of death from pulmonary embolism was thought by Frey[13] to be due to cardiac failure caused by the reflex and mechanical effect of the embolus. Bieling[5] stated that the immediate results of embolism are only apparent death and the patient present the aspect of shock rather than suffocation, for the excluded portion of the lung is usually not large. He emphasized the use of cardiac stimulants and artificial respiration even after apparent death. Haggart and Walker[17] showed experimentally that loss of 52 to 60 per cent of the pulmonary circulation is required to cause death in a cat.

TREATMENT

Several prophylactic measures have proved useful. Walters[47] reduced the incidence of pulmonary embolism from 0.34 to 0.09 per cent by the use of thyroid extract. Popper[38] concluded that thyroxin does not prevent thrombosis and embolism. Boschamer's experience[6] with thyroxin was not entirely satisfactory as hypertonia without pulse modification developed in some patients and others were resistant to thyroxin. Nicolaysen[33] used a combination of thyroid extract and ephedrine and recommended its use. Fluids up to 3,000 c.c. daily, administered preoperatively and postoperatively by subcutaneous, intravenous and rectal routes, early exercise of legs and arms with deep breathing according to Pool,[36] loose abdominal binders as stressed by Bancroft and Stanley-Brown,[3] measures to combat postoperative nausea and vomiting so as to keep the abdomen quiet, and avoidance of traumatization of fat, are other prophylactic measures which have been advocated.

Miscellaneous procedures have been recommended; cardiac stimulants in case of myocardial insufficiency; 30 cm. elevation of the feet in bed for a week after operations or fractures of the lower extremities for all patients more than twenty years of age as advocated by Nicolaysen.[33] Ephedrine sulphate when the pulse curve is above the temperature curve is stressed by Boschamer.[6] Calcium chloride for all patients more than thirty years of age, for eight consecutive days after operation or injury, was thought to be of value by Martin[30]; and sodium thiosulphate given intravenously was recommended by Bancroft and Stanley-Brown.[3] In cases of thrombosis Payr[37] recommended applications of hot air and of mustard plasters twice daily to the extremity.

Active treatment recommended in cases of pulmonary embolism consists of oxygen with artificial respiration and cardiac stimulants as used by Lotheissen;[28] intracardiac injections of epinephrine which gave Lutaud[29] good results; and surgical removal which has proved successful in two cases of Nystrom,[34] in one case of Kirschner,[25] and two cases each of Crafoord[8] and Meyer.[31] The time element and delicateness of the procedure are factors limiting successful removal.

MATERIAL

A study was made of all cases diagnosed pulmonary embolism since 1924 at St. Mary's and St. Luke's Hospitals, Duluth. After a critical culling in which all medical cases and those in which there was the slightest doubt as to the accuracy of the diagnosis were discarded, twenty-

eight cases of fatal postoperative pulmonary embolism remained, fifteen cases from St. Mary's Hospital, and thirteen from St. Luke's Hospital. The histories of the cases were reviewed from every possible angle in an effort to obtain information which might be of aid in clarifying to some degree knowledge of this condition.

AGE AND SEX

The oldest patient was seventy-five years of age and the youngest was only eighteen years. Embolism had occurred in the latter after a simple appendectomy. The average age of the entire group was fifty-one years, which coincided with the reports in the literature. Sixteen (57 per cent) were more than fifty years of age and twelve were less than fifty years. The number of patients in each decade of life was as follows: from eighteen to twenty years, one; twenty to twenty-nine years, two; thirty to thirty-nine years, four; forty to forty-nine years, five; fifty to fifty-nine years, seven; sixty to sixty-nine years five; seventy to seventy-nine years, four.

The sex ratio was not in keeping with that of the literature as twenty-one patients (75 per cent) were women and seven (25 per cent) were men. There is a factor of error to be considered here as more women than men were operated upon in both hospitals.

YEAR AND SEASON

The time of year had no relation to the formation of pulmonary embolism. Of the twenty-eight cases studied three cases occurred in January, one case in both February and March, three cases in April, two in both May and June, one case in July, three cases in August, two in September, four in October, five in November and two in December. During the winter months there were sixteen (57 per cent) cases and during the summer months twelve (43 per cent).

CONDITION OF PATIENTS

The patients were analyzed as to body weight or state of nutrition with the following results. Data were available in twenty-four of the twenty-eight cases. Of these twenty-four patients ten were obese, six were well nourished, five moderately nourished, and three undernourished. These figures tend to show that patients in good state of nutrition are more susceptible to pulmonary embolism. This is in accordance with the work of Snell.[43]

Likewise the condition of the patients preoperatively was studied. The condition of ten (35 per cent) was good, of thirteen (46 per cent) fair, and of six (19 per cent) poor. The patient's condition was said to be good if the physical examination showed the absence of a major physical disability; fair, if minor changes such as fever, respiratory infection, localized peritonitis, attacks of vomiting or diarrhea, diabetes, mild cardiac involvement, and so forth, were present. The six cases were classified in poor condition because of chronic ulcerative colitis of two years' duration with marked emaciation in one case, generalized peritonitis from a ruptured appendix in one, generalized peritonitis from ruptured duodenal ulcer of four and one-half hours' duration in one, erysipelatous phlebitis of the left leg and infected hydrocele in one, moderately severe valvular heart disease in one, and age which was seventy-five years with myocardial failure in one.

These figures show that a fairly large percentage (65) of these patients were not in good condition prior to surgery. This high figure is unquestionably of some significance and should be ample reason for considering the possibility of embolism in all patients undergoing operation who are not in good condition.

The cardiac status was studied preoperatively from the standpoint of blood pressure and cardiac findings. The blood pressure was obtained in nineteen cases, nine of which were normal, and ten above normal. Pressures below 150 systolic and 90 diastolic measured in millimeters of mercury were considered normal. The lowest blood pressure found was 120 systolic and 80 diastolic, the highest, 235 systolic and 130 diastolic. The average pressure was 159 systolic and 94 diastolic. In four cases with hypertension the heart was enlarged.

These figures show that all ranges of blood pressure were present. The average blood pressure of 159 systolic and 94 diastolic is probably significant in that it shows that the level of the blood pressure disregarding cases of cardiac insufficiency is not significant in pulmonary embolism.

OPERATION AND ANESTHESIA

There seems to be no body site or type of operation immune to embolism. The various operations in my series are given in Table II. Procedures in the lower part of the abdomen slightly predominated.

TABLE II. OPERATION AND ANALYSIS OF LOCATION OF OPERATIVE FIELD

Operation	Cases	Per cent
Appendectomy with drains	2	
Without drains	1	
Appendectomy and oöphorectomy	2	
Appendectomy and ventral hernia	1	
Appendectomy and cholecystectomy	4	
Cholecystectomy	4	
Taking down of gastro-enterostomy and excision of gastro-jejunal ulcer	1	
Repair of ruptured duodenal ulcer	1	
Gastro-enterostomy	1	
Uterine suspension and repair	1	
Hysterectomy	3	
Exploration	1	
Herniotomy	1	
Prostatectomy	1	
Vasectomy and cystostomy	1	
Drainage of infected hydrocele	1	
Thyroidectomy	1	
Operation for bilateral cataracts	1	
Location of operative field		
Upper part of abdomen	7	25
Lower part of abdomen	12	42
Combination of upper and lower parts of the abdomen	6	21
Extra-abdominal operations	3	12

Various anesthetics were used but the frequency of spinal anesthesia seems to be significant. What effect spinal anesthesia has on the general condition of the patient is only conjectural. General anesthesia was used in eighteen cases, in which ether and ethylene were given in two cases, ether and nitrous oxide in six, ether alone in five and ethylene alone in five. Spinal anesthesia was used in six cases and local anesthesia in four.

Embolism occurred at a slightly shorter interval following operation than the average time reported in the literature. The shortest period was three days and the longest thirty-one days with an average of six and nine-tenths days following operation.

CONDITION OF PATIENT AT TIME OF EMBOLISM

The condition of the patient at the time of embolism can best be given in the following manner. Twenty-four patients had fever ranging from 99° to 103° F. and four had normal temperatures at the time of the embolism. Of the twenty-four cases with fever, complication in the thorax shown by bloody sputum, pain and so forth was present in seven; thrombophlebitis was present in five. In nine cases no apparent cause for the fever was found and the wound was thought to be responsible in three.

These figures seem to show that these patients were very sick at the time the embolus occurred and suggest also that infection plays a important rôle in pulmonary embolism. They also tend to change the general consensus of opinion, that patients are generally in good condition when the embolus occurs.

Postoperative thrombophlebitis occurred in six cases as follows: two days after operation and one day before death in one case; nine days after operation and three days before death in one; thirteen days after operation and two days before death in one; eight days after operation and one day before death in one, twenty-two days after operation and three days before death in one; and eleven days after operation and one day before death in one. In two cases the leg was found to be edematous at necropsy. This prevalence of thrombophlebitis is striking and is in direct opposition to the work of Brown,[7] who did not find a single case of fatal embolism in eighty-seven cases of postoperative phlebitis.

LENGTH OF LIFE AFTER EMBOLISM

Death occurred within thirty minutes after the embolus in thirteen cases of my series, from thirty minutes to one hour in six, from one to one and a half hours in two, from one and a half to two hours in two, in three and a half hours in one case, in eleven hours in one, in seventeen hours in one and in twenty-four hours in two cases. The shortest time was five minutes and the longest twenty-four hours. These figures show that if surgical intervention is to be considered as a method of treatment it must be extremely prompt after the occurrence of the embolus.

DEHYDRATION AND LABORATORY RECORDS

An attempt was made to study the fluid intake of the patients in order to ascertain the part that dehydration might play in this condition. A summation was made of the daily intake by mouth, intravenously, subcutaneously and rectally. An arbitrary line was drawn in that all intakes of less than 1,600 c.c. daily were con-

sidered inadequate and those over 2,000 c.c. adequate. Fluid intake was found to be adequate in sixteen cases and inadequate in twelve. These figures show nothing conclusive in regard to the present problem but emphasize that many postoperative cases have an inadequate fluid intake.

All laboratory reports were investigated without finding any condition relative to the blood counts, blood chemistry, urinalysis and so forth that was in any way sufficiently common to be of any significance.

Postoperative orders directed toward prevention of emboli were not frequently seen on the order sheets in the cases studied. Only one patient in the entire group received thyroid extract and only frequent movement of the patient was stressed.

NECROPSY OBSERVATIONS

Necropsy was done in fifteen cases (53 per cent) of the group. The presence of thrombosis in the veins of the pelvis and lower extremities at postmortem examination in twelve cases in my series is significant. Thrombi were present in the left femoral vein in five cases, in the left saphenous vein in one case, in the left ovarian vein in one, in the right ovarian vein in three cases, and in the right femoral vein in two. That the left iliac and femoral veins apparently represented the chief source of the thrombosis is in accordance with the views of Robertson.[41] That the pulmonary emboli probably represented the entire thrombus in four of the cases probably accounts for the absence of thrombi elsewhere. The source of these emboli is proved additionally by the fact that some of the emboli were long, some as long as 34 cm., and were exact casts of the veins of the lower extremities.

In the lung the size of the embolus was directly related to the rapidity of death. If the entire pulmonary artery was occluded, death followed in a very few minutes. In these cases no infarction of the lung, such as occurs from small emboli, was present. The exact location of the embolus, which was given in only twelve cases, was: in the pulmonary artery in eight, in the left lung in three and in the right lung in one case.

In only one case in the entire group was a malignancy found. This was a carcinoma of the prostate gland. The hearts in the entire series were uniformly enlarged in proportion to the level of the blood pressure.

SUMMARY AND CONCLUSIONS

Twenty-eight cases of fatal postoperative pulmonary emboli were reviewed from a clinical and pathologic basis. The average age at which pulmonary embolus occurred was fifty-one years, the youngest patient being eighteen years of age and the oldest seventy-five years. Pulmonary embolism occurred more commonly in patients who were more than fifty years of age.

The sex ratio in this series was three women to one man. A factor of error based on the fact that more women than men were operated upon is to be considered.

More emboli have occurred in the first nine months of 1932 in this group of cases than in any single year. This is of importance when it is considered that fewer operations have been done than in any single year before. No easy explanation for this increase can be ventured.

Obesity and overweight seemed to play an important rôle in the etiology of embolism. The body region or type of operation was not significant.

Sixty-five per cent of the patients were not in good condition before operation, and the average blood pressure in the group was somewhat above normal, that is, 159 systolic and 94 diastolic in millimeters of mercury.

As to the type of anesthetics employed the frequency of the spinal type seemed only slightly suggestive of an etiologic relationship.

Embolism occurred on an average of six and nine-tenths days after operation. That the patients were not in good condition just prior to a fatal embolism, as is the usual conception, and that infection was frequently present are shown by the presence of fever in a large percentage (85) of cases. Thrombophlebitis also proved to be a serious etiological factor in pulmonary embolism.

Death was extremely rapid in the greater number of cases, twenty-three of the twenty-eight patients having died within two hours. The observations at postmortem examination coincide with previous investigations in that the pelvis and lower extremities were the site of formation of the emboli and that the speed of death depends on the amount of pulmonary circulation which is impaired.

Finally, postoperative measures to possibly prevent pulmonary embolism were not taken except in a few cases.

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TRANSPLANTATION OF THE URETERS TO THE SIGMOID COLON FOR EXSTROPHY OF THE BLADDER AND OTHER URETERAL ABNORMALITIES WITH URINARY INCONTINENCE*

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FOLLOWING Coffey's report of the submucous method of transplanting the common bile duct and the ureter into the intestine in experimental animals, C. H. Mayo, in 1912, applied the method clinically to ureteral transplantation for the treatment of exstrophy of the bladder and other vesical and urethral abnormalities in which the bladder failed to hold urine. The results in these cases, including those in which exstrophied bladders were removed and plastic operation performed on the penis, have established these procedures as the preferable ones in the treatment of these conditions. Transplantation of the ureters to the sigmoid colon permits control of urine by competent anal sphincter. It permits removal of the exposed, irritated bladder which is prone to the formation of carcinoma and it prevents dilatation of the ureters, and sequelæ due to pyelonephritis which cause death in most cases in which treatment is not carried out.

In April, 1931, I presented a summary of seventy-six cases of exstrophy of the bladder, including cases of complete epispadias, in which transplantation of the ureters to the sigmoid colon had been performed at The Mayo Clinic. This method consisted of the transperitoneal transplantation of the ureters to the sigmoid colon in separate stages, with an interval of from twelve to fourteen days between operations. The original method of submucosal transplantation reported by Coffey was used. The transplantations were done without the use of catheters. The number of these cases has now increased to eighty-four. Most of the patients were operated on by C. H. Mayo. In the last seven years, I have operated on twenty; sixteen for exstrophy of the bladder, two for complete epispadias, and two for congenitally deformed or traumatized urethras with total urinary incontinence. In the entire series of cases, the mortality rate was approximately 4 per cent based on the number of cases, not operations. In approximately 81 per cent of the cases, excellent results were obtained from operation; in 14 per cent results were fairly good, and in 5 per cent they were unsatisfactory. More than five years have elapsed since operation in twenty-seven cases, and ten years have elapsed since operation in thirteen. In forty of the cases the patients were operated on before the age of fourteen years, and in seventeen they were operated on between the ages of fifteen and thirty-four years. In two of the series of seventy-six cases, the exstrophied bladders were carcinomatous; one of the patients was a child aged six years, the other a woman aged twenty-three years.

Although approximately accurate estimations of renal function could be made subsequent to the operation by a study of the nitrogen constituents of the blood, the advent of intravenous urography added exceedingly valuable information in outlining the renal pelves, calices and ureters, thus permitting more accurate determi-

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nation of renal function and of whether ureteral obstruction was present. The results in fifty-nine of the seventy-six cases in which the Mayo method of ureterosigmoidostomy was carried out and the exstrophied bladder removed have been described in detail. In 50 per cent of the cases, there has been no evidence of renal infection subsequent to operation; in 21 per cent of the cases slight evidence has occurred at long intervals; usually the infection is manifested by the presence of fever lasting for a day or two with or without pain in the lumbar region. However, there may be weeks and months of comfortable existence between episodes. The infection is apparently mild and has little sustained effect on the patients. If the patients are children, they continue, apparently, to develop satisfactorily and become immune to the infection. Further evidence of the mildness of the renal infection is the fact that of the nine patients who died at home, in periods varying from one to seven years subsequent to the ureteral transplantation, only one patient presented definite evidence of renal infection as the cause of death.

The cinema film illustrates the method of submucosal transplantation which has been used in all of our cases, the distal 2.5 cm. of the ureter being carried between the mucous membrane of the muscularis mucosa of the rectosigmoid. That such a valve functions satisfactorily was assumed if the patients did not present evidence of pyelonephritis. Intravenous urograms had confirmed the assumption that normal renal function without hydronephrosis can be expected in cases in which the anastomosis has been made accurately. Although the most suitable age at which to carry out the operation would seem to be in early childhood, preferably not before the age of three and a half years, or until such time as the child has obtained complete control of the rectal sphincter, yet good results have been obtained in cases of adults. Three cases illustrative of this follow:

A man now aged forty years, whose ureters were transplanted to the rectosigmoid colon and the exstrophied bladder removed in 1916 by C. H. Mayo, has not been ill since the operation and there has never been any evidence of renal infection. Intravenous urograms have shown the renal pelves and calices to be normal in size, and the concentration of dye in these areas has been normal. The values of nitrogen in the blood have also been normal. He is able to hold urine in his rectum for four to five hours during the day and from six to eight hours during the night. In December, 1930, I performed a plastic operation on the penis, with correction of epispadias. Two women on whom ureterosigmoidostomy for exstrophy of the bladder was done in 1913 and 1917 respectively, were later married. The former was delivered of normal twins in 1924 and the other was delivered of a normal child the same year. Excellent operative results have continued. The former of these two patients was aged thirty years when the operation was performed.

Besides achieving urinary control and removing a chronically irritated and infected bladder, there has been noticeable improvement psychologically of the patient's viewpoint on life.

INDICATIONS FOR THE OPERATION

Not only is operation indicated in cases of exstrophy of the bladder in which transplantation of the ureters to the sigmoid colon seems to be indicated, but in cases of complete epispadias, absence of urethra and complete urinary incontinence. Also it would seem to be indicated for other abnormalities of the urethra with complete urinary incontinence, either congenital or the result of injury to the urethra and its sphincter; for extensive vesicovaginal fistulas, unsuccessfully treated by plastic operations on the bladder and vagina, and finally, for extensive carcinoma of the bladder whose removal or treatment by any other method of procedure would appear inadvisable.

The time for this presentation does not permit a consideration of ureterosigmoidostomy for treatment of extensive, malignant tumors of the bladder in which anything but total cystectomy seems inadvisable. In such cases different conditions exist and different problems present themselves, for in addition to the debilitating effects of malignant lesions of the bladder on the patients' general condition, dilatation of the upper portion of the urinary tract and infection is practically always present. In such cases any operative procedure, even cystostomy, frequently carried a high operative risk. This condition of renal and ureteral obstruction and infection is practically always absent among children who have exstrophy of the bladder. Their ureters are usually almost normal in size and the kidneys

are without infection. It is to these factors and to the division of the transplantation into stages that I attribute the low mortality rate of ureterosigmoidostomy in the treatment of exstrophy of the bladder when it is carried out in separate stages for children. When exstrophy of the bladder, however, has been allowed to remain into adult life, dilatation of the ureters or infection of the kidneys has occasionally occurred to a greater or lesser extent, and hence the greater risk of ureteral transplantation for exstrophy of the bladder for the adult.

UNILATERAL VERSUS BILATERAL TRANSPLANTATION

It was C. H. Mayo's experience and it has been mine, that it is unnecessary to use either tubes or catheters in transplanting ureters to the sigmoid colon if one normal sized ureter is transplanted at a time. Experience at the clinic would seem to indicate that in the treatment of exstrophy of the bladder and other congenital abnormalities of the bladder and urethra, with total incontinence, that the risk of such operation is far less, particularly for young children, than that of simultaneous bilateral ureteral transplantation.

In the last few years various summaries of the results of ureterosigmoidostomy have appeared in the literature of this and other countries[4,9,10,11,13] with good results in cases of unilateral and bilateral simultaneous transplantation. A review of these cases, however, seems to establish the fact that bilateral simultaneous transplantation of the ureters to the sigmoid colon for exstrophy of the bladder carry mortality rates far in excess of transplantations when done in separate stages. Indeed on the basis of cases, not operations, this difference has been as great as the rate of 15 or 20 per cent as compared to 4 per cent when the ureters are transplanted separately. Cabot's report of fourteen cases of exstrophy in which the ureters were transplanted in separate stages without mortality, is a striking example of the safety of the procedure when carried out in two stages. The cause of death in cases in which bilateral simultaneous transplantation has been done, has been reported elsewhere as being due for the most part to the sloughing of the anastomosis or the end of the ureters to which the pressure of the catheters may have contributed, and to shock. These factors are lacking in the transplantation of first one ureter and then the other because tubes and catheters are not used and hence pressure necrosis cannot occur, and because the actual time of the operative procedure is reduced by more than half. This shortening of the operation, although usually of but moderate importance in operating on adults, appears to be an important factor in the risk of any operative procedure on children.

The time during which patients were in the hospital as compared with that following simultaneous bilateral ureteral transplantation shows the average length of time to be approximately the same. Moreover, in many of the cases a plastic operation was done on the penis either at the time the bladder was removed or a few days later in addition to the transplantation and removal of the bladder.

In a comparison of postoperative progress in the two groups of cases, it was noted that the reactions from the operations were more severe and more prolonged, as indicated by irregularity of fever and increase of pulse rate, when both ureters were transplanted simultaneously. It has been my experience that when one ureter at a time is transplanted, postoperative reactions are usually slight. The period of fever and increased pulse rate lasts for a few days subsequent to transplantation of the first ureter only, and following the transplantation of the second ureter very little reaction occurs. With the patient in good condition, removal of the exstrophied bladder and a plastic operation on the penis are operations without appreciable risk.

The ureteral catheter is of value in certain cases in which dilated ureters exist due to obstruction, either from an extensive inflammatory process around the ureteral orifice or from extensive malignant lesions of the bladder involving the base and the trigone. If, after due consideration, ureteral transplantation is considered as the best procedure in the case of extensive carcinoma of the bladder, as a preliminary to or as a part of the cystectomy, it may be true that it is better to accept the increased risk of the operative procedure and to perform simultaneous bilateral ureteral transplantation using catheters as described by Coffey, rather than to divide the operation into stages.

SUMMARY

Transplantation of the ureters to the sigmoid colon permits control of urine by the competent

anal sphincters, and it permits removal of the exposed, irritated exstrophied bladder which is prone to the formation of carcinoma.

In a group of eighty-four cases of exstrophy of the bladder, including cases of complete epispadias, in which transplantation of the ureters to the rectosigmoid has been carried out at The Mayo Clinic, the mortality rate was approximately 4 per cent, based on the number of cases, when the method of transplanting one ureter at a time was employed, with an interval of from ten to fourteen days between the transplantations.

In approximately 81 per cent of the cases excellent results followed the operations; in 14 per cent results were fairly good; in 5 per cent they were unsatisfactory. More than five years have elapsed since operation in twenty-seven cases and ten years have elapsed since operation in thirteen.

Studies of renal function subsequent to operation by intravenous urography and studies of the nitrogen content of the blood would indicate that when the anastomosis is accurately made, the kidneys function normally.

Our experience would seem to indicate that it is unnecessary to use either tubes or catheters in transplanting the ureters to the sigmoid colon if one normal sized ureter is transplanted at a time; this is particularly true in the treatment of exstrophy of the bladder, when the risk of such operation is far less, particularly for young children, than that of simultaneous bilateral ureteral transplantation. The time patients remained in the hospital, as compared with the time following simultaneous bilateral ureteral transplantation, is approximately the same.

Ureterosigmoidostomy is indicated in cases of congenital abnormalities of the bladder or urethra in which total urinary incontinence exists, in extensive, irreparable vesicovaginal fistulas, and in certain selected cases of extensive carcinoma of the bladder. In the latter cases, the use of ureteral catheters in bilateral simultaneous transplantations may have a definite advantage in accepting the increased risk of one operative procedure rather than in dividing the operation into stages. This is a debatable point.

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PATHOLOGY OF BLADDER NECK OBSTRUCTION WITH PARTICULAR REFERENCE TO CYSTOSCOPIC PROSTATECTOMY*

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IT IS the purpose of this paper to describe the pathology of bladder neck obstruction with particular reference to correction of the obstruction by cystoscopic prostatectomy. The principles upon which relief of the obstruction by this method is based are discussed. The various forms of obstruction are considered separately with description of the gross pathology and the findings on cystoscopic and rectal examination. Mention is made of the suitability of each form for relief by transurethral methods.

RATIONALE OF RESECTION

The rationale of cystoscopic prostatectomy is based upon important clinical observations concerning changes in the obstructing prostate, the result of constant drainage of the bladder by suprapubic cystostomy or urethral catheter. It was shown that a shrinking and decrease in the size of the gland often followed a period of drainage. On rectal examination a markedly enlarged, swollen, spongy prostate was often transformed into a slightly enlarged firm structure. Cystoscopic examination of the vesical orifice before drainage showed marked intravesical projection and urethral intrusion of bulging lobes whose surfaces exhibited greatly increased vascularity. On examination of the same patient after a period of bladder drainage the intruding lobes had receded and their increased vascularity was no longer apparent. These regressive changes in the prostate were most marked when the drainage was by suprapubic cystostomy. In some cases prolonged drainage was followed by sufficient shrinking of the prostate to permit healing of the suprapubic wound and temporary return of normal urination.

These observations raised the question, would not removal of only the obstructing portion of the gland be followed by these same regressive changes in the unremoved portion and thus permanently restore bladder function? This question was partially answered by Young from his experience with his punch operation in cases of median bar and contracture. He, and later Caulk, showed that the removal of small pieces of tissue by punch instruments effectively corrected the obstruction in bars and contractures. It should be noted that all bars are not cicatricial, a number of them consisting largely of glandular hyperplasia. Caulk was so impressed by his results that he extended the use of his cautery punch to obstructions due to hypertrophy of the prostate. He demonstrated that in the cases where a small proportion of the total growth could be thus removed there was usually relief of the obstruction and with it shrinking of the remaining part of the gland. This work of Caulk established the fact that relief of all types of obstruction could be obtained by transurethral resection when removal of the obstructing tissue by means of his punch was technically feasible. His contention that radical enucleation by open operation was not necessary in such cases has been repeatedly borne out.

As a result of this experience and histologic studies of the changes referred to, Caulk believes that benign prostatic enlargement is a form of inflammatory hyperplasia and is not neoplastic. Among others who subscribe to this belief are Ewing, Green and Brooks. This question is of significance in comparing the prospect for permanent relief by resection with prospective relief by open operation. If the enlargement is not neoplastic, recurrence need not be expected when the obstructing tissue has been removed and relief probably will be permanent if an adequate resection has been made.

ADVANTAGES OF RESECTION

Cystoscopic prostatectomy is rapidly replacing major surgical removal in the treatment of bladder neck obstruction. Of a large series of reported cases, this method was found suitable in 90 per cent of cases. It is preferable to major surgery because of important advantages to the patient. These are, a smaller risk to life than can be assured by the most satisfactorily con-

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ducted perineal or suprapubic operation; the assurance of as good functional results; a shorter period of convalescence without the distress imposed by prolonged drainage of urine and slow healing of the wound; and a substantial saving to the patient's finances.

IMPORTANCE OF PREOPERATIVE DIAGNOSIS OF FORM AND POSITION OF OBSTRUCTION

Cystoscopic prostatectomy is a highly technical procedure and its proper performance depends upon accurate knowledge of the precise form and position of the obstructing lobes. It is not enough to merely establish the presence of residual urine and an enlarged prostate, often the extent of the investigation when suprapubic prostatectomy is performed. When transurethral methods are to be employed a thorough understanding of the gross morphologic character of the obstruction and proficiency with cystoscopic instruments are essential. The precise form that the prostate has taken and the portion of it responsible for the obstruction must be recognized through interpretation of the cystoscopic views. With this information, adequate and safe resection of the obstructing tissue may be undertaken.

CLASSIFICATION OF BLADDER NECK OBSTRUCTION

Any pathologic change in the structures of the vesical neck or in the innervation of its sphincters interfering with free passage of urine is a bladder neck obstruction. Obstructions are of two general types: (1) those due to disturbances of innervation of the bladder wall and sphincters, and (2) those due to actual pathologic change in the tissues of the vesical neck. In transurethral resection we are concerned only with obstructions due to pathologic changes in the tissues of the bladder neck. The various forms of obstructions in this group may be classified accordingly as they are benign, inflammatory or malignant. The classification is as follows:

I. Benign prostatic enlargement.
   - A. Bilateral lobe enlargement.
   - B. Solitary posterior commissural enlargement (mid-lobe).
   - C. Solitary subcervical lobe enlargement (pedunculated mid-lobe).
   - D. Bilateral and posterior commissural enlargement.
   - E. Bilateral and subcervical lobe enlargement.
   - F. Bilateral, posterior commissural and subcervical enlargement.
   - G. Anterior lobe enlargement.

II. Median bar and contracture of the vesical neck.

III. Carcinoma of the prostate.

BENIGN PROSTATIC ENLARGEMENT

Benign prostatic enlargement, in one of its various forms, is found in approximately 70 per cent of cases of obstruction. The condition is either an adenomatous or an inflammatory hyperplasia of the prostate, characterized by an arrangement into one or more lobes. Enlargement of the gland may produce lateral lobes, posterior commissural enlargements, subcervical lobes and anterior lobes separately or in combination.

SOLITARY FORMS OF BENIGN ENLARGEMENTS

Bilateral lobe enlargement is a frequent form of obstruction. In the usual case there are symmetrical intra-urethral enlargements of the two lateral lobes with compression of the prostatic urethra. Greater enlargement may occur in one lobe with displacement of the prostatic urethra toward the opposite side. In one group of cases the enlargement is confined to the prostatic urethra. In another group the internal sphincter dilates allowing upward or intra-vesical enlargement of the lateral lobes. In this group there may be considerable upward projection with elongation of the prostatic urethra. On rectal examination in either group the prostate is enlarged, smooth, of rubbery consistency with a median furrow palpable and a deep sulcus on either side between the periphery of the gland and the pubic arch. Cystoscopically deep clefts are seen in the anterior and posterior positions running well down into the urethra. When intravesical enlargement is present, adjacent zones of bladder wall are obscured by the projecting lobes and there is elongation of the prostatic urethra. This form of obstruction usually is well suited for cystoscopic prostatectomy (Fig. 1). The intruding portions of the lateral lobes are resected, beginning above at the base of the gland and continuing down into the urethra as far as the verumontanum. Contraindications to cystoscopic prostatectomy are occasionally found in this form of obstruction. These are present when the intravesical projection of the lateral lobes is so great that it is impossible to see over them

with the operating telescope, or when the prostate is spongy and vascular, causing it to bleed briskly on the slightest instrumentation, thus obscuring vision. Very occasionally there is marked



Fig. 1. Bilateral Lobe Enlargement. (From Randall, Surg. Path., Prostatic Obstructions.)
This form of obstruction is readily relieved by cystoscopic prostatectomy. The portions of lateral lobes bulging into the urethra are resected, beginning above at the base and continuing down to the level of the verumontanum.

compression and deformity of the urethra and it may be impossible to pass the instrument.

Solitary posterior commissural enlargement, often called mid-lobe or glandular bar, is another frequent form of obstruction due to benign enlargement. The enlargement originates in prostatic tissue connecting the lateral lobes in the floor of the urethra immediately under the muscles of the posterior vesical lip. When the growth is small there is merely elevation of the posterior vesical lip. When large there is marked intravesical projection with the trigone almost entirely obscured. The enlargement early resists the action of the trigone muscle and there is great hypertrophy of this structure. Difficulty in starting the stream is an early and constant complaint in patients with this form of obstruction. Marked hypertrophy of the bladder wall is common and diverticulum formation is not infrequent. Rectal examination is often misleading when no enlargement of the lateral lobes is present. The mid-lobe may not be palpable even though considerably enlarged. On cystoscopy, forward projection and elevation of the posterior vesical lip by a rounded growth is noted. Clefts are found in the right and left posterolateral positions running down into the urethra and merging together in midline. Hypertrophy of the trigone is marked. In advanced cases this structure is often entirely hidden from the view obtained through the right angle vision observing telescope. Cystoscopic prostatectomy is an ideal procedure for this form of obstruction (Fig. 2). The obstructing tissue between the two clefts is resected until the trigone is entirely visible.

Obstruction may be due to enlargement of the subcervical or Albarran glands. These glands form a small group in the floor of the prostatic urethra in midline between the posterior vesical lip and the verumontanum. They are just below the mucosa, and enlargement of them results in a rounded nodule with a narrow pedicle—the so-called pedunculated mid-lobe. Growth is always upward through the sphincter with the formation of a ball valve which closes the internal vesical orifice during voiding. Rectal examination is usually unsatisfactory since an enlarged subcervical lobe is often not palpable. The diagnosis of this form of obstruction is readily made at cystoscopy. View of the pedicle of the subcervical lobe is best obtained by use of a forward vision telescope (Fig. 3). The pedicle is severed and the lobe easily removed by cystoscopic prostatectomy.

COMBINED FORMS OF BENIGN ENLARGEMENT

Each of these forms of benign prostatic enlargement may occur in combination with another form. Combined forms of enlargement commonly found are bilateral lobe and mid-lobe, bilateral lobe and pedunculated mid-lobe and occasionally bilateral lobe, mid-lobe and pedunculated mid-lobe.

In obstructions due to the combined enlargement of the lateral lobes and the posterior commissure, enlargement in the posterior comissure leads to dilatation of the internal vesical sphincter and permits upward growth of the lateral lobes. In advanced cases there is marked intravesical projection with elongation of the prostatic urethra. At rectal examination the upward direction of the enlargement is apparent, differing in this respect from the downward and backward growth commonly found in pure bilobar enlargement. At cystoscopic examination a deep

cleft separating the lateral lobes is found in mid-position anteriorly, and clefts are found in the right and left postero-lateral positions between the median and lateral lobes. The degree of usual anterior cleft and deep clefts in right and left posterolateral positions. With the forob-lique and retrospective telescope the pedunculated mid-lobe is seen projecting into the bladder. Re-

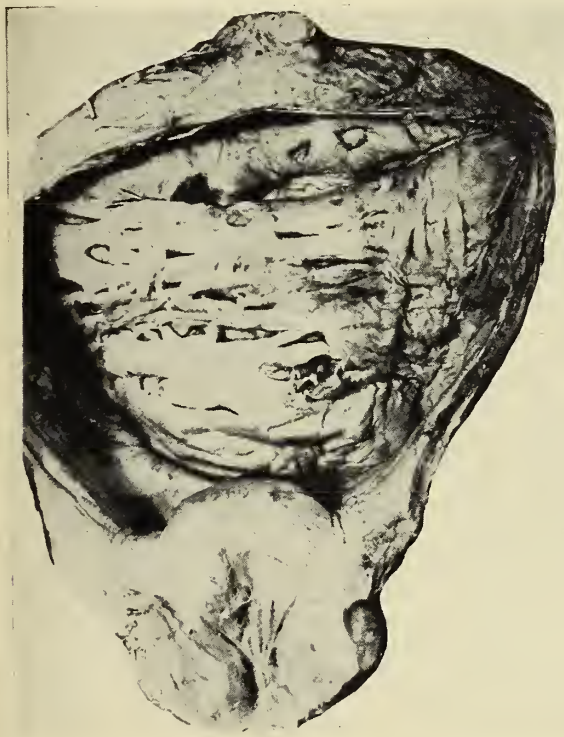


Fig. 2. Posterior Commissural Enlargement (mid-lobe). (From Randall.)
Cystoscopic prostatectomy is an ideal procedure for this form. Sufficient tissue is resected from the posterior commissure until the entire trigone is clearly visible.

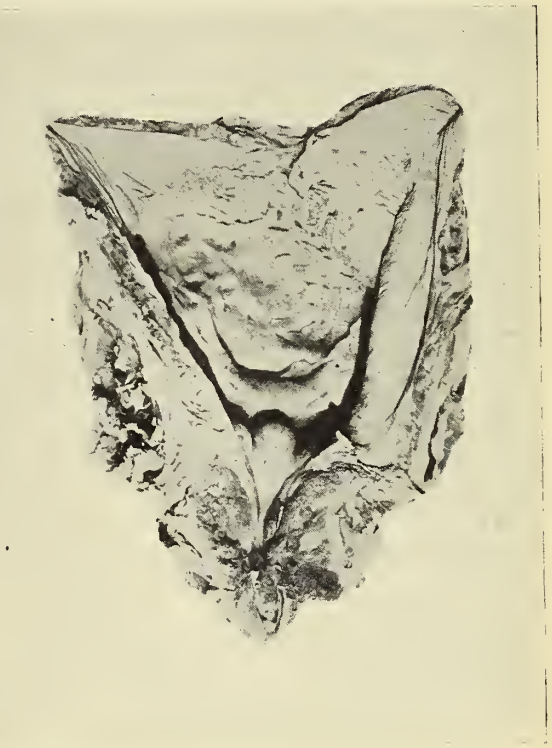


Fig. 3. Solitary Subcervical Enlargement (pedunculated mid-lobe). From Randall.)
Relief of obstruction is readily accomplished by severing the pedicle of the lobe and removing it transurethrally.

elongation of the prostatic urethra varies with the stage of the growth. At cystoscopic prostatectomy the posterior commissure is resected first, followed by resection of sufficient portions of the lateral lobes to provide a wide funnel-shaped opening. Marked intravesical projection of the lateral lobes and a spongy vascular gland may be encountered in this type of obstruction and prove to be contraindications for cystoscopic prostatectomy.

In combined bilateral lobe and subcervical lobe enlargement pathologically there is the usual bilateral lobe enlargement plus a pedunculated mid-lobe. Here again upward growth of the subcervical lobe causes dilatation of the internal sphincter with marked intravesical enlargement of the lateral lobes in advanced cases. On rectal examination the upward enlargement of the laterals is suggested. Cystoscopically there is the moval of the obstruction by cystoscopic prostatectomy is accomplished by complete resection of the pedunculated mid-lobe and obstructing portions of the lateral lobes.

When obstruction is due to the combination of bilateral lobe, posterior commissural and subcervical lobe enlargement, there is intra-urethral and intravesical enlargement of the lateral lobes and upward growth of the posterior commissure with the trigone obscured to some degree. Added to this there is a pedunculated mid-lobe projecting upward through the internal vesical orifice. The presence of this form of obstruction is recognized at cystoscopy in the manner described above. The obstruction usually is readily removed by cystoscopic prostatectomy, except in occasional cases exhibiting contraindications to the method mentioned above. The pedunculated mid-lobe and posterior commissure are resected

first, followed by removal of sufficient tissue from the lateral lobes to provide a wide open vesical neck and prostatic urethra.

Anterior lobe enlargement is the rarest form of prostatic enlargement, and is an infrequent cause of obstruction. Hyperplasia in this location is uncommon because glandular tissue of the anterior commissure is rarely present past puberty. The hypertrophy is usually small and may be found in combination with lateral lobes. Its presence is recognized at cystoscopy by the finding of clefts in the right and left anterior oblique positions. The growth should be easily removed by cystoscopic prostatectomy.



Fig. 4. Median Bar. (From Randall.)
This form of obstruction is relieved by resecting the forward projecting mass until the normal curve between the trigone and verumontanum is restored.



Fig. 5. Carcinoma of Prostate. (From Randall.)
Obstruction is relieved by resecting the obstructing tissue in the posterior and lateral quadrants, providing a wide funnel-shaped prostatic urethra.

MEDIAN BAR AND CONTRACTURE

Obstructions may be due to inflammatory changes in the prostate and tissues of the vesical neck, the result of long continued infection. These changes are characterized by replacement of the glandular and muscular structures with fibrous tissue. In the usual case the process is most marked in the tissues beneath the posterior quadrant of the vesical neck with the formation of a median bar. In advanced cases the changes occur throughout the prostate with general contraction of the gland, narrowing of the entire prostatic urethra, and fixation of the vesical neck. When the condition has reached this stage it is called contracture of the bladder neck. Median bar and contracture often occur in very young individuals but are more commonly found in men over forty. In many of the cases a history is obtained of a previous gonorrheal urethritis and extension of the infection to the posterior urethra and prostate. A study of the gross pathology of the obstructions due to the formation of a median bar shows a dense inelastic mass of forward projecting tissue forming the posterior quadrant of the vesical neck. The bar causes elevation of the posterior quadrant and the forepart of the trigone. Immediately below the bar the urethra falls away sharply and the verumontanum is drawn upward by the sclerotic process. On cut section the bar is composed of fibrous tissue and a small amount of muscular tissue with glandular tissue absent. Marked hypertrophy of the bladder wall and trigone are usually present and bladder stone and diverticulum formation are occasionally found associated. On rectal examination the prostate is usually of normal size but of firm consistency. With a sound in the urethra an increased thickness and firmness of the tissues at the bladder neck may be evident on rectal palpation. Diagnosis of ob-

struction due to median bar or contracture is made only on cystoscopic examination. Since there is no enlargement of the lateral lobes no clefts are seen on examination of the bladder neck. The sharp forward projection of the posterior vesical lip and elevation of the forepart of the trigone are visible. Except in advanced cases with general contracture the prostatic urethra falls away immediately below the bar and is quite roomy. Upward displacement of the verumontanum may be noted. This condition is ideally suited for cystoscopic prostatectomy (Fig. 4). The forward projecting mass is resected, restoring the normal curve between the trigone and the verumontanum. Relief of the obstruction may also be accomplished by use of one of the punch instruments.

CARCINOMA

In another group of cases the obstruction is due to carcinoma of the prostate, when, unfortunately, obstruction occurs only after the malignant changes are advanced. In most of the cases there is extension of the disease to the bladder base, seminal vesicles and neighboring lymphatic glands. In this advanced stage, cure of the disease by radical removal of the prostate by perineal operation is out of the question and the surgeon's only purpose is to provide comfort to the patient during the remainder of his life by the relief of the urinary obstruction, through cystoscopic prostatectomy. Pathologically the chief feature of the obstruction in these cases is the loss of elasticity and extreme fixation of the structures of the vesical neck. Narrowing of the prostatic urethra is common. When upward extension occurs there is involvement of the bladder submucosa and muscularis and nodular projections are found on the bladder base covered with intact mucosa. Not infrequently carcinoma is found associated with benign prostatic hypertrophy. In these cases a small area of adeno-carcinoma is found on making careful sections of a lateral lobe. Rectal examinations usually shows some degree of enlargement of the prostate with stony hardness and irregularity of its surface the outstanding characteristics. In early cases a single stony hard nodule may be the only finding with the remainder of the prostate normal. Such cases present excellent chances for cure of the disease and should be submitted at once to radical removal of the prostate by perineal operation. In advanced cases there is a broad hard irregular mass of tissue occupying the prostatic fossa extending upward toward the bladder base and seminal vesicles, with obliteration of the median furrow and filling in of the lateral pubo-prostatic sulci. Cystoscopic examination shows a firm fixed narrowed prostatic urethra. The vesical margin is usually irregular with small projections often visible. Examination of the bladder shows trabeculation and hypertrophy of the trigone. When upward extension of the growth has occurred, flat nodules are seen on the bladder base and occasionally a large projecting mass is found. Cystoscopic prostatectomy as mentioned above is strictly a palliative procedure in carcinoma of the prostate and its employment is limited to cases with obstruction (Fig. 5). The obstructing tissue in the posterior and lateral quadrants is resected and a wide-funnel-shaped prostatic urethra obtained. Deformity and narrowing of the prostatic urethra are occasionally present in carcinoma and passage of the instrument is impossible.

In conclusion the following should be emphasized. Regressive changes following bladder drainage alone occasionally permit the return of normal urination. Restoration of bladder function in these cases is only temporary, since the intruding tissue responsible for the obstruction is still present and will continue to interfere with urination, eventually setting into motion the same processes leading to obstruction of the bladder. The objective of transurethral resection is to prevent such an occurrence by removal of the potential obstruction. The difference between enucleation and transurethral resection is only one of degree; neither is a complete prostatectomy. The lobular hypertrophied mass compresses the rest of the gland toward its periphery. Enucleation removes the lobular hypertrophied mass, leaving the surrounding compressed prostatic tissue. The urologic surgeon trained in cystoscopic resection need only consider enucleation of the prostate by open surgery when contraindications for cystoscopic prostatectomy are present. Transurethral methods should be employed in every case of obstruction due to median bar or contracture. In carcinoma with obstruction it is the best palliative procedure at our disposal and provides comfort to the patient through relief of the urinary obstruction.

LITHOLAPAXY

A NEGLECTED OR FORGOTTEN PROCEDURE

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and
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THE constant changes that are taking place in the field of surgery necessitate a revision of our views on various technical procedures. Oftentimes a slight change in chemistry or physics renders a procedure useful and workable which previously had been dangerous and useless. Pitkin's recognition of the importance of the specific gravity of spinal anesthetics, re-popularized a wonderful method of anesthesia which had been discarded as dangerous twenty-five years ago. A new change in the chemistry of the iodides resulted in uroselectan and skiodan for intravenous pyelography after Rountree had tried and discarded sodium iodide as an intravenous pyelographic medium because of the indistinct shadows produced. The use of Lugol's solution in the preoperative preparation of patients with goiter, the use of phenoltetraiodophthalein as a test of liver function and for rendering the gallbladder refractive to the roentgen ray, are the result of slight changes which have had far-reaching effects. Innumerable instances could be cited along the same line.

In the past nine years, transurethral prostatic resection has been developed. Previous to 1923, a certain few selected cases were subjected to cystoscopic prostatectomy. These cases comprised the group of hypertrophies in which the median lobe of the prostate was causing the obstruction and it was removed by the so-called "punch operation" using instruments devised by Young, Braasch and Caulk. In 1923 and 1924, the field of selection in these cases was gradually widened and some lateral lobe obstructions were successfully removed. This impetus resulted in the development of many different types of instruments for the excision of the hypertrophied prostate; McCarthy, Davis, Bumpus, Kerwin, Caulk, Foley, and others invented very ingenious instruments for accomplishing this resection. Only time will tell which instrument is the best and the simplest. Suffice it to say that at present any instrument which satisfactorily removes the obstruction and controls post-operative hemorrhage accomplishes the desired result.

We think that it may be stated, without fear of serious contradiction by one familiar with the method, that transurethral prostatic resection is here to stay and that 90 per cent of all cases of prostatic hypertrophy can be handled by this method. It is probably the greatest advance made in surgery in the past decade.

This development will naturally affect the methods used in handling conditions frequently associated with retention due to prostatic hypertrophy. Approximately 4 to 5 per cent of all patients with prostatic hypertrophy have bladder stones. This complication no doubt will be cited as one of the contra-indications to transurethral prostatic resection. In our opinion such is not the case. In 1878 Bigelow described a lithotrite. Prior to that time litholapaxy was more or less deprecated, principally because of the attendant difficulties in removing the fragments of stone after crushing. Bigelow also developed an evacuator which overcame this difficulty, and the procedure received due recognition and came into popular use. However, in spite of its efficiency, with the development of asepsis and the attendant development of surgery, suprapubic cystostomy became the method of choice to the extent that now the mention of lithotrite or the procedure of litholapaxy is met with interrogations as to just what is meant by these terms. The demonstration of the lithotrite provokes amazement and almost incredulity in practically all members of the medical profession, not excepting urologists who limit their practice to diseases of the genito-urinary tract.

The instrument today is practically identical with the instrument described by Bigelow (Fig. 1). No changes or improvements have been made which are of any importance and we believe that any inventor whose instrument has

withstood the test of time for fifty-four years in our rapidly changing surgical world should not be forgotten. The instrument must be seen to be appreciated. Its crushing end is shaped

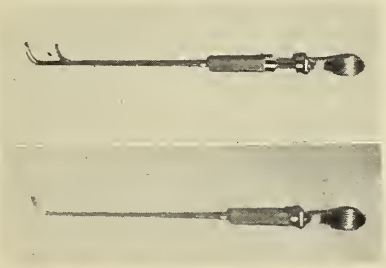


Fig. 1. Bigelow lithotrite with jaws opened and closed.

roughly like an ordinary metal urethral sound except that the "shoe" portion comprises two blades, a female and a male portion. The male blade is movable in a slot and its fenestrated margin engages the female blade between which the stones are crushed. A lock and screw arrangement are placed in the handle of the lithotrite for obtaining great pressure and leverage in crushing the stones. The fragments are washed out through the cystoscope instead of the Bigelow evacuator.

Crenshaw in 1923 reported 153 cases of bladder stone removed by litholapaxy. He includes in his list of contraindications to this procedure, the presence of prostatic hypertrophy, bladder tumor, diverticulum or other complications which necessitate cystostomy following the removal of the stone. Of this group prostatic hypertrophy is by far the commonest. With the development of transurethral prostatic resection, prostatic hypertrophies are no longer *per se* a contraindication to litholapaxy because now the stones can be crushed and removed and the obstructing prostatic tissue can be removed later cystoscopically.

So we wish to call the attention of the profession to a neglected or forgotten instrument, namely the lithotrite, which should never have been neglected or forgotten, and remind them that it is just as useful and efficient now as it was fifty years ago, and also we wish to make the point that bladder stones *per se* are no contraindication to the procedure of cystoscopic prostatectomy. Under spinal anesthesia the lithotrite can be inserted, the stones crushed, and removed. Then an indwelling catheter can be inserted and the patient can be prepared for transurethral prostatic resection just as when no stones are present. When the general condition of the patient has become satisfactory as determined by phthalein, blood chemistry and degree of infection, the obstructing prostatic tissue may be removed with any of the various types of instruments according to the preference of the operator.

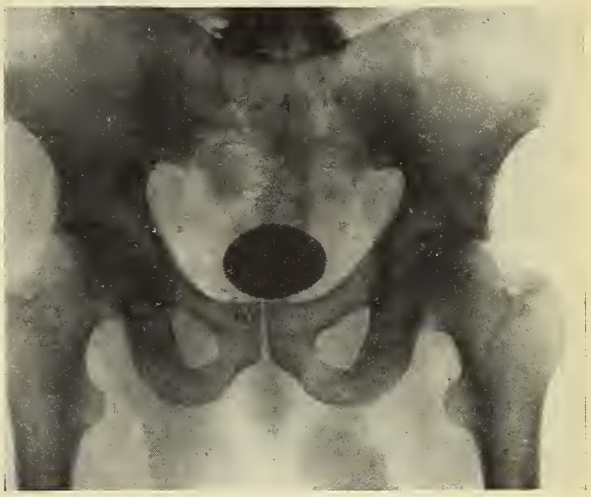


Fig. 2. Roentgenogram of a patient with a large bladder stone and multiple prostatic stones. This stone was crushed with a lithrotite and the fragments removed through a cystoscope.

In conclusion it might be well to enumerate the contraindications laid down by Crenshaw in 1923. With the exception of prostatic hypertrophy they are as follows:

1. A stone of such large size that the jaws of a lithotrite will not embrace it.

2. A stone so nearly filling a contracted or deformed bladder that the lithotrite jaws cannot be opened.

3. Prostatic hypertrophy, bladder tumor, diverticulum, or other complications which would necessitate cystotomy following the removal of the stone. In cases of prostatic hypertrophy and vesical calculus in which there is some contraindication to cystostomy, litholapaxy can usually be performed under sacral or general anesthesia in spite of the prostatic obstruction. There are many cases, also, where a small prostatic hypertrophy is increased in size by the congestion due to the bladder stone and all residual urine and symptoms will disappear following the removal of the stone; this type of case should unques-

tionably have a litholapaxy. Stones in a deep diverticulum with narrow orifice require cystostomy, while those in shallow pockets can often be crushed and the pocket opened widely into the bladder by fulgurating the orifice.

4. If the nucleus of the stone is known to be of such physical character that it cannot be readily freed from the lithotrite, unless the operator is prepared, if necessary, to perform a cystostomy at the same place and time.

5. If a stone is attached to the bladder wall, and if any operation has previously been performed on the bladder or adjacent structures.

6. Stones with a sharp foreign body, such as a hairpin or knife blade, as a nucleus, unless proved on cystostomy to be free in the bladder.

UROLOGY IN MIDDLE EUROPE

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ONE who visits the clinics of Middle Europe necessarily starts with certain fixed impressions. The abundant comment in our periodicals upon the unhappy conditions in Germany and Austria leads one to expect dilapidated hospitals and inadequate equipment, balanced only by the skill and brilliance of the professors. The able professors are there, but dilapidation and inadequacy are not. Germany and Austria are feeling the pangs of poverty, but they are struggling successfully to provide adequate medical care for their citizens.

How is this done? In Germany, citizens having monthly incomes below one hundred dollars are required to belong to the Krankenkasse or health insurance society. Ordinary care is furnished these patients (about 80 per cent of the population) by panel physicians at a very small monthly sum per patient. If hospitalization is required, these practitioners refer the individual to an approved hospital where the insurance company pays hospital expenses but no physicians' fees.

Roughly, 10 per cent of the population consult private doctors on the same basis as in the United States. Another 10 per cent cannot pay even the Krankenkasse premiums, and are cared for by charitable organizations.

There is some grumbling among the insurance patients, but in the main they are well satisfied—which is easily understood when one sees how long they remain in the hospitals, what good care they receive, and how often they go from the hospital to a "cure" in the mountains or at the seaside at the company's expense. The physician is the loser in this system, since his fees are pitifully inadequate.

TYPES OF HOSPITALS

The present system of medical care in Germany has been adapted to pre-existing facilities without the construction of clinics or hospitals by the insurance companies.

The University Clinic is the principal unit in German medicine. It consists of a number of sub-clinics, one for each of the major specialties, *i.e.*, Surgery, Gynecology and Obstetrics, Medicine, Eye, Ear, Nose and Throat, and at times other surgical specialties such as Urology or Orthopedics. Each of these clinics is an independent organization ruled over with absolute powers by the chief. He is appointed by the University but is apparently subjected to but few restrictions. This system leads to considerable duplication of laboratory and x-ray facilities. While the method may strike one as a waste of money for a country which is in bad financial condition, the Germans feel that it tends to turn out more competent specialists, since the surgeon must of necessity receive a broad training in order to care for all non-surgical complications which may develop in his patients, and in order to make his own diagnoses quite unaided. Thus a German surgeon is well-versed in x-ray, Internal Medicine, Neurology, and in many other fields.

The hospitals belonging to these clinics are large, well-equipped, and well-staffed.

The large cities usually have their own mu-

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nicipal hospitals, which in many cases are also divided into semi-independent units for the various specialties. An outstanding example of this type of institution is the Städtisches Krankenhaus at Frankfort-am-Main, with Schmieden in charge of Surgery and Volhard at the head of Medicine.

A third type of hospital is owned by some physician and has its parallel in this country.

The fourth large group consists of hospitals supported by institutions such as Catholic Sisterhoods or other Church organizations. To my mind the outstanding institution of this type in Germany is St. Hedwig's in Berlin.

ORGANIZATION WITHIN THE CLINICS

Germany is still a country of titles. In a place in which the druggist's wife is Frau Apotheke and the wife of the head-waiter is Frau Direktor to her social acquaintances, one expects to find an array of titles—and does. After completing certain prescribed work at a University Clinic, the graduate receives the title "Privat-dozent" which he retains for life or until appointed Professor. The latter title is also permanent. Neither implies an active University position.

Within the Clinic, the chief is usually a Professor (whether in a University, a municipal, an institutional, or a private clinic). His first assistant and personal representative is the Oberarzt. Beneath him are the assistentäerzte and volontäeraerzte.

The assistants correspond to our internes, residents, and fellowship men. Volunteers may serve merely as observers, or they may work as assistants. The chief of a German surgical clinic possesses absolute powers over his domain that are probably not equalled by those of any monarchs now ruling.

Because of the economic depression and the surplus of physicians, assistants remain in the clinics for many years, and men of outstanding ability usually retain their clinic appointments rather than go into independent private practice. As a result, there is an oversupply of assistants, Sauerbruch, for example, having five assistants as well as two nurses scrubbed for every operation.

The German medical societies have themselves prescribed certain requirements, including place and length of training and an examination as to proficiency, which must be met before a graduate may use the title of specialist. In Urology, for example, this includes a minimum of two years at an approved clinic as well as certain preliminary training in general surgery. The societies seem quite able to enforce this rule without government aid, at the same time protecting themselves and the laity against the "six weeks specialist." It is to be hoped that the American medical profession will in the future adopt some such effective measures for controlling those who profess to be specially trained.

UROLOGICAL CLINICS

Four main types exist. The first is the general surgical clinic without special provision for urological patients. Cystoscopic equipment is rather inadequate and the excellence of the care depends upon the interest which the chief feels in such cases.

In the second type, there are beds set aside for urological cases, usually in charge of an assistant who rotates upon the various services. If the chief is especially interested in urology, or if the service falls into the hands of an interested and competent assistant, urological work may be exceedingly well done. The best examples of clinics of this type are those of Voelcker at Halle, of Wildbolz at Bern, and of Schmieden at Frankfurt. At the last-named place, the work has reached a high stage of excellence under Sebenning, who is equally interested in General Surgery.

The third type is the outpatient clinic without access to hospital facilities of its own. This is typified by the organization of Joseph in Berlin. It is amazing to see in these clinics how much in the way of operative cystoscopy can be done in the outpatient clinic.

The fourth type is that in which the urological division is an independent unit, distinctly not subsidiary to any other, and headed by a chief who limits himself to Urology.

The outstanding example of this type of organization is the clinic of Professor A. von Lichtenberg at St. Hedwig-Krankenhaus in Berlin. His service, on which the writer was privileged to spend five months as a volunteer, consists of more than 200 beds in a general hospital, but is quite independent of the surgical and medical services, which contain some 600 beds. X-ray and laboratories are shared with the other departments, but there is a separate operating and cystoscopic suite for Urology.

The clinic is entirely the product of the efforts

of Professor von Lichtenberg, who has built it up in a remarkably short time from very modest beginnings. He is known to every urologist for his work in the development of retrograde pyelography (with Voelcker in 1906), as one of the editors of and contributors to the "Handbuch der Urologie," undoubtedly the outstanding text and reference book of Urology today, and for his important part in the development of successful intravenous urography (1929-Uroselectan).

His affability and personal charm have undoubtedly played an equal role with his great energy and ability in his success. The presence of an able American assistant, Dr. P. B. Hughes, enables the visitor who speaks only English to profit fully from a visit to the clinic. His German assistants, particularly Oberarzt Heckenbach, are well trained, friendly, and helpful to visitors who speak the language.

In spite of the large size of the clinic, the Professor is intimately acquainted with the condition of each patient. Arriving daily at eight, he views the films of the previous day, then makes rounds with his assistants, stopping to see every case. At eleven, cystoscopies are begun. At two the scheduled work of the clinic is complete and the Professor is free for his studies. On Tuesday and Friday ward rounds are deferred until after the operations are over. Working in one room, he often operates upon eight or ten cases before one o'clock. His daily personal supervision of so large a group of patients is made possible by the careful training of the assistants and the delegation of responsibility to them so that no time is lost in making the visits.

The two chief interests of the clinic are in intravenous urography and in conservative surgery of the kidney. The cases are so well selected by the referring physicians that it is rare to see a patient who does not present a definite urological lesion. Kidney disease predominates in the form of stone, pyelonephritis, tuberculosis, and tumor. Lower tract lesions are less common. Gonorrhea is rarely admitted to the clinic. There is no outpatient department, the patients being returned to the referring physician for the work usually done in the dispensary.

UROLOGICAL WORK

Cystoscopy and urography.—Cystoscopy is rather lightly regarded. Anesthesia is often omitted, and asepsis is variable. In some clinics the urethra is touched with dry cotton as the only preparation. In others, the parts are carefully cleansed. In von Lichtenberg's clinic cap, mask, and gloves are worn for cystoscopy. The German instruments are optically somewhat superior to ours, giving a larger field of vision and greater clarity, but mechanically are somewhat inferior.

Excretion urography has perhaps been rather overdone in Europe as here, but with a somewhat clearer realization of its limitations. It is worth noticing that in von Lichtenberg's clinic every patient who has an intravenous urogram is also subjected to cystoscopy. It is plain that in the clinic in which intravenous urography was made practicable, it is realized that the method does *not* yield adequate information about the bladder.

There is a growing tendency to limit excretion urography to three classes of cases: (1) those in which there is a faint suspicion of a kidney lesion (vague abdominal pain); (2) those in which retrograde pyelography is impossible or contraindicated; and (3) those in which it yields insufficient information (functional lesions).

We in this country should familiarize ourselves with the deficiencies of excretion urography in order that the general practitioner may not develop too much blind confidence in it. In two particular types of cases it will often fail, *i.e.,* in early, non-destructive renal tuberculosis, and in all but the most advanced neoplasms of the bladder.

The most popular agent is Uroselectan B (Neo-Iopax) because of the small quantity required and the good visualization. Abrodil (Skiodan) is also widely used, while Pelviren is just appearing. Uroselectan (Iopax) is practically abandoned.

Bilateral retrograde pyelograms are rarely made. Wildbolz is emphatic in condemning all retrograde pyelography in tuberculosis, fearing that it may cause pyelovenous backflow and the dissemination of bacilli into the systematic veins. In view of the high percentage of cases in which renal tuberculosis is associated with secondary lesions in the prostate and vesicles, and in view of the now well-known fact that urethral manipulations often release bacteria from these organs into the blood stream, I cannot believe that the danger of pyelography is greater than that of cystoscopy, at least in the male. Yet how but by

cystoscopy may we be sure that the sound side actually *is* sound?

Anesthesia.—There is a decided preference for regional and local anesthesia. The most noteworthy advances were found in the clinic of Kirschner (a general surgeon) in Tübingen. He induces local and regional anesthesia with a very dilute mixture of percaine with 0.5 per cent procaine, given through a pressure apparatus. Compressed CO_2 forces out the solution at a pressure of three atmospheres.* Administration is rapid (a few minutes), and the resultant anesthesia very satisfactory. With it I saw him perform thyroidectomy, radical mastectomy, resections of the stomach, cholecystectomy, excision of the rectum, closed reduction of fractures, and all the usual operations of surgery quite painlessly. For abdominal operations he supplements the local infiltration with splanchnic block with remarkable success.

Kirschner has also devised a type of spinal anesthesia by which he can produce a girdle of analgesia, leaving most of the lower extremity sensitive. This is accomplished by replacing a part of the spinal fluid with air, then elevating the hips. The air protects the lower roots from the anesthetic agent (percaine-starch), which floats upon the remaining spinal fluid. It is claimed for the method that the blood pressure is but little affected because the vasomotor nerves to the extremities are left intact. Both methods demand a thorough trial.

Paravertebral anesthesia is favored by many in spite of its one disadvantage in kidney surgery—dissection around and traction upon the pedicle is painful. This can be overcome by the use of gas during this stage of the operation, or a bilateral block can be induced by Kirschner's method, resulting, according to the latter, in complete anesthesia.

Von Lichtenberg has recently replaced paravertebral by the high epidural anesthesia of Dogliotti. Five c.c. of 1 per cent novocain are injected epidurally between the last dorsal and the first lumbar spines. If no anesthesia appears in five minutes, it is concluded that subarachnoid injection has been avoided, and 45 c.c. more are given. Complete anesthesia and relaxation are secured, but I am a little fearful of accidental subarachnoid injection and death from so large a dose of novocaine.

Spinal anesthesia is usually avoided as too dangerous. One gets the impression after seeing it used that the danger lies in the method of caring for the patient during the administration and operation, rather than in the method itself. Our own precautions with respect to the maintenance of the blood pressure, close observation, and the use of the Trendelenburg position are usually not observed. On the other hand, all these methods are used in conjunction with Kirschner's "girdle" anesthesia so that one wonders whether the manner of administration or the adjunct measures are responsible for the constancy of the blood pressure. I am of the impression that both are important.

Avertin is used almost entirely as a basal anesthetic, although Lexer (Munich) uses it combined with Narkophen for full anesthesia even in the upper abdomen and has found it quite safe in several hundred cases.

Intravenous anesthesia is also generally restricted to a basal level and supplemented by the volatile gases. Pernocton is thus used at the Rudolph Virchow Krankenhaus, apparently with great satisfaction.

Asepsis.—As in the United States, asepsis varies extremely. In one large clinic the Professor omits cap, mask, and gloves. Many omit cap and mask, while still more wear only cotton gloves, which seem to me more objectionable than bare hands. The custom of throwing soiled sponges upon the floor seems bad, but its effects are largely obviated by the almost universal wearing of galoshes by everyone who enters the operating theater. On the other hand, the common practice of reserving a separate operating room and often a separate pavilion for septic cases is superior to our own habit of doing both clean and infected cases is the same suite.

OPERATIVE TECHNIC

There are no striking differences between Middle European and American operative technic either in Urology or in General Surgery. One sees rough, careless, bloody surgeons and delicate, cautious, dexterous surgeons in about the same proportion as in the United States.

They have the same cleavage between those who advocate conservative kidney operations and

*This apparatus is very similar to that devised and used by Farr of Minneapolis as early as 1910.

those who condemn them as useless. The small group of perineal prostatectomists opposes the large group of suprapubic operators just as they do here.

It is a revelation to see the remarkable exposure that von Lichtenberg obtains by resecting the last rib and by dissecting carefully about the kidney.

Hydronephrosis.—Von Lichtenberg is an enthusiastic advocate of conservative operations for hydronephrosis. He resects the redundant portion of the pelvis, excises the strictured portion of the ureteropelvic juncture, and reimplants the ureter into a dependent portion of the pelvis. He emphasizes the need for fixation of the structures during healing (catheter splint and nephropexy) and for prolonged drainage (nephrostomy). He is inclined to favor this operation for patients with dilated pelvis and normal ureter, even in the absence of anatomic narrowing at the ureteropelvic juncture. Wildbolz has reported excellent late results from a similar operation.

For hydronephrosis due to narrowing of the intramural ureter or to stenosis of the meatus, von Lichtenberg widens the ureter by a silk stitch drawn through its wall above the point of stenosis by a Reverdin needle passed through the meatus from the bladder. The suture is brought out through the meatus and tied tightly. Widening occurs when it cuts through.

On the other hand many surgeons, among them Bachrach of Vienna, question the wisdom of conservative renal operations, feeling that nearly all patients subjected to them will ultimately come to nephrectomy.

Stone.—Nephrolithiasis is extremely common in Northern Germany, and equally rare in Southern Germany and Switzerland. This difference remains to be explained.

Goldberg has produced urinary stones in vitro in von Lichtenberg's clinic. He describes two colloids in the urine, one of which causes the aggregation of urinary salts into solid masses, while the second inhibits this aggregation. The precipitating colloid has been recovered from the blood and from the pelvic mucosa of patients suffering from nephrolithiasis. He believes that a deficiency of the second colloid leads to stone formation, but cannot yet explain the deficiency. The relative roles of infection, of obstruction, and of dietary factors remain in doubt.

The average urologist is inclined toward nephrectomy for unilateral stone with hydronephrosis, functional impairment, and a sound opposite kidney, but von Lichtenberg, impressed by the frequency of subsequent stone formation on the opposite side, urges conservatism. He removes the stone by pelviotomy, makes a decapsulation to interrupt the lymphatic connections with the colon, a nephropexy to encourage the formation of a collateral circulation, and a nephrostomy for drainage; he feels that his results justify the effort.

Ureteral stone is removed more often by operation and less often by manipulation than in this country.

Tuberculosis of the kidney, whether destruction has occurred or not, is regarded as strictly surgical if the other side is sound.

Pyelonephritis.—The medical therapy is practically standard. For coccic infections, small, repeated intravenous injections of neoarsphenamine (sulpharsphenamine intramuscularly or acetarsone by mouth if the veins are inaccessible). For bacillary infections, urotropine or its derivatives or some of the newer drugs such as hexylresorcinol or neotropine (similar to pyridium), Results are difficult to evaluate because of the tendency of the average case to run its course to recovery regardless of the form of therapy. For cases which become chronic and resist medical measures, von Lichtenberg uses the decapsulation-nephropexy-nephrostomy combination described above. His impression is that a great many patients recover after this operation (it is not done except as a last resort), but follow-up studies of a large series remain to be made.

Ureteral stricture has escaped the overemphasis which it has received in this country. It is not generally regarded as a clinical entity, but as a complication of some other disease, usually tuberculosis or an invasion by diseases of adjoining viscera.

Sympathectomy is regarded as still in the experimental stage. It has yielded interesting results in a few cases of chronic nephritis, but no opinion as to its real value is available.

Bladder tumors receive no uniform treatment.

Suprapubic and cystoscopic fulguration are commonest. Joseph and his students treat nearly all cases by the cystoscopic application of trichloracetic acid. Although he claims a high percentage of cures in benign lesions and very satisfactory palliation in malignant ones even

when advanced, he has found few followers.

Segmental resection is regarded as the method of choice for localized, accessible carcinomata.

For localized carcinomata too extensive for resection or fulguration, Sebenning of Frankfurt makes ureterosigmoidostomy and excises the bladder. Although he has reduced the mortality of the operation to 20 per cent (50-90 per cent in most hands when done for carcinoma), the late mortality from infection is rather high. However, if the patient with an inoperable bladder tumor, than which there is no more distressing disease, can be given two or three years of cleanliness and comfort, no operation is too serious, nor any risk too high.

Radiation is but little used.

Bernhardt has used intravenous isamin blue at the Charité in Berlin for the treatment of inoperable cancer. The dye is taken up by the reactive connective tissue at the periphery of the tumor and stains it blue. In a few cases the drug apparently exerts some specific effect upon the tumor cells and causes them to regress. Work is being done in an attempt to combine isamin blue with radium salts in order to permit concentration of radium about tumors by intravenous injection.

It has occurred to the writer that isamin blue might also be used to delineate tumors, particularly in the bladder, as an aid to adequate operation.

Interstitial cystitis or Hunner ulcer is apparently much less frequent in Middle Europe than in the United States. When it occurs, it is equally resistant to treatment. In a case which resisted all conservative treatment Sebenning anastamosed a circular loop of ileum to an opening in the dome of the bladder to increase its capacity. Ten years later the patient is still symptom-free. The loop empties itself during urination both in this patient and in a number of dogs done more than a year ago. Serious infections have not developed.

While this is apparently rather heoric treatment, these are desperate cases, and this ingenious and original method merits a thorough trial.

Prostate.—The transurethral treatment of prostatic obstruction in Middle Europe has scarcely begun. With the exception of one or two men in Berlin who make forage of the gland by the method of Luys, I did not encounter anyone who operated in this manner. Von Lichtenberg has begun experiments with an instrument of his own, while Schwarz of Vienna uses the punch, but guides it with a finger in a suprapubic incision.

Suprapubic prostatectomy is the usual operation of election for prostatic hypertrophy, but a few, notably Wildbolz, use the perineal approach, Voelcker uses a method of his own, the ischiorectal, which does not appeal to me as particularly advantageous. Von Lichtenberg uses both suprapubic and perineal methods, reserving the latter for poor risks. It is to be regretted that the average urologist everywhere inclines to use one method for every case instead of attempting to adapt the method to the patient.

For the *inflammatory median bar* one sees a variety of procedures, all from above, including wedge excision, divulsion, and plastics in great variety. None yield uniform good results, so that one can be certain it is only a question of time before transurethral methods will be adopted.

In the *retention without incontinence* due to tabes dorsalis, Schwarz gives pilocarpine and measures the resultant bladder pressure. If it rises, he feels that the bladder muscle is still competent, and excises a piece of the internal sphincter with the punch. The results are good. I have no doubt that many such patients are living a needless catheter life in this country, and that our cases of "cord bladder" should be carefully reviewed to pick them up. One must recognize the possibilty, too, that in an individual with a lesion of the spinal cord and consequent detrusor weakness, a low grade prostatic enlargement which would ordinarily cause no trouble may lead to complete retention.

Prostatic carcinoma is regarded very pessimistically. In most clinics the attitude is: no obstruction, no treatment; for obstruction, the catheter or cystostomy. Radium is practically unused, probably partly because of the economic situation. They do not seem to share the optimistic view of the writer that much of value may be done with palliative operations.

RESEARCH

The attitude toward medical research in Central Europe differs somewhat from our own. Interest in it is more general. It reaches at times clear to the general practitioner who may even

spend his vacation in clinical investigation. It tends more in that direction, at least in Urology, but the laboratory side is not neglected even though the facilities for experimental work are smaller than our own. Except for a few large institutions, the buildings and equipment for this purpose are poor.

But consider what part of Urology we owe to the Germans and Austrians, to whom each case appears to present possibilities for research. Nitze and cystoscopy; Simon and nephrectomy; Wilms and Grawitz and renal tumors; Israel and renal carbuncle; Voelcker and von Lictenberg and pyelography; and von Lichtenberg and intravenous urography, to mention only a few. Research on the clinical side is almost a routine affair.

CONCLUSION

Why a trip to European clinics? From the urological point of view, such a trip is rather for the man who has had his fundamental training than for him who seeks it. The fundamentals are best acquired in this country where there are no language difficulties and where there is less overcrowding. The conscientious man who goes abroad hoping to secure an adequate training in a year will be disappointed. True, he can go to Vienna and listen to some of the best-known men in their line, as Blum, Rubritius, Hryntschak, Croiss, Schwarz, and Bachrach undoubtedly are. But the practical side—that of making the diagnosis and of governing or carrying out the treatment under supervision—will be lacking. It takes more than lectures to make a capable practitioner.

In addition, the German system of teaching by example over long periods—really the apprenticeship system—makes learning in a clinic slow. One must overcome a certain amount of almost unconscious antagonism against the foreigner—it amounts only to man's natural tendency to give preference to his own countrymen. I should estimate three years as the minimum time for a urological training in Germany—and then that training will be superior in the fundamentals but inadequate in some of the finer points, as operative cystoscopy.

On the other hand, one who has had his fundamental training cannot fail to gain by contact with men whose background differs so sharply from his own, yet whose professional problems are so similar. Also the opportunity to convert the great names of urology into mental images is of immense value. Both stimulate the mental processes.

Both types will benefit from contact with a foreign language and foreign customs. One cannot be long in Germany or Austria without becoming familiar with a different mode of life and thought. The constant political discussions will stimulate a healthy interest in one's own politics; the crossing of customs borders brings gratitude for the unity of interest in America; the various coinage systems improve one's ability for quick calculation; in brief, such a journey increases one's appreciation and enjoyment of his work, and particularly of his country.

CASE REPORTS

AVULSION OF FLEXOR PROFUNDUS DIGITORUM

ARTHUR N. COLLINS, M.D.
Duluth

On the afternoon of July 30, 1928, a man aged forty-two walked into my office with his left index finger wrapped up in an improvised bandage and asked for a dressing. The terminal phalanx of the finger was missing. He stated that earlier in the afternoon, while he was working as a laborer helping to unload hay into a barn, the finger became entangled in the block and tackle used for handling the hay, and he was pulled upward until his body was finally off the ground. He struggled to free himself, and, in doing so, the terminal phalanx of the finger was torn off. The finger presented merely a ragged wound—a stump end, and this was dressed with a simple surgical dressing. As I finished tying the bandage, he drew from his pocket the avulsed end of his finger, but to it was attached the whole tendon of the flexor profundus digitorum—thirteen inches in length, a photograph of which accompanies this report. The tendon had been pulled from

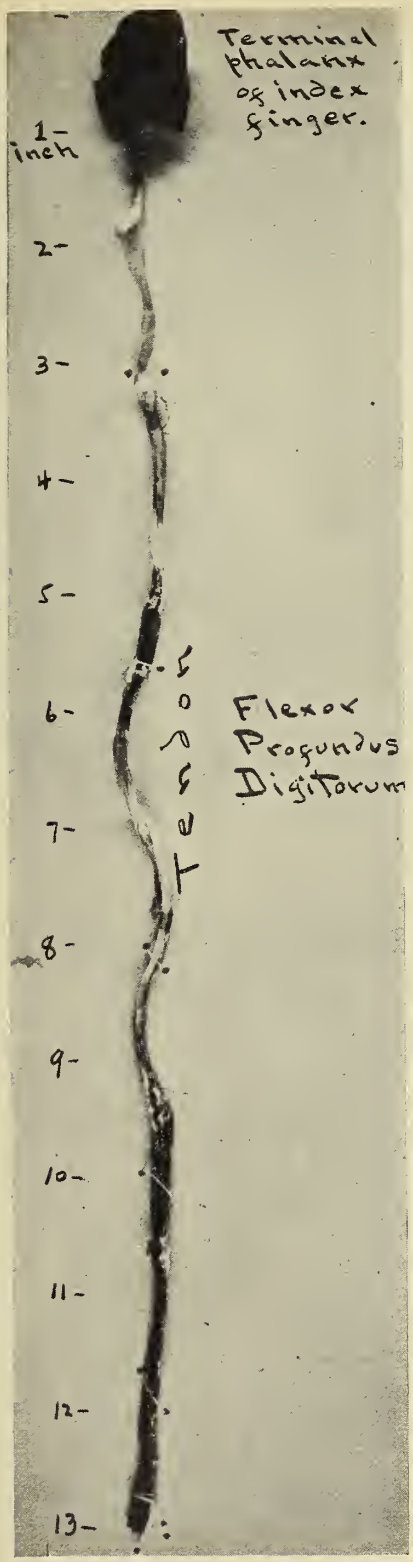


Fig. 1. Dr. Collins' case.

its muscular attachment in the forearm and slipped out of its sheath so neatly that only a few very short muscle fibers were clinging to the proximal end of the tendon. The wound healed per primam and his flexor function of the finger stump was practically unaltered.

ISOLATED FRACTURE OF THE LESSER TUBEROSITY OF THE HUMERUS

FRED H. STANGL, M.D.
St. Cloud, Minnesota

Very little is found in the literature and standard textbooks on fracture of the lesser tuberosity of the humerus. Only one complete report by Lorenz[3] of this fracture was located; mention is made by Santee[4] of two cases, both of which were associated with posterior dislocation of the shoulder joint. In view of these facts, it has been deemed worth while to report a case of isolated fracture of the lesser tuberosity of the humerus, including accurate description of the accident, x-rays, treatment and resulting disability.

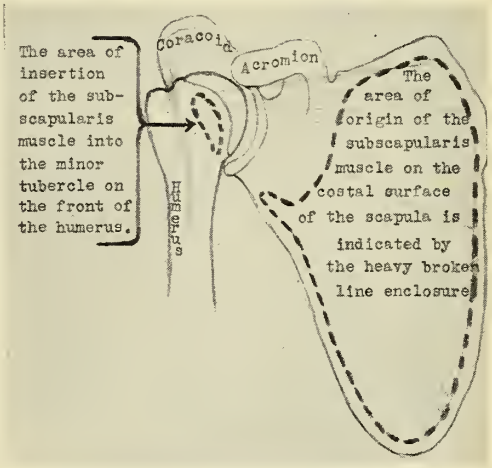


Fig. 1. Anterior view of the humerus and scapula showing the origin and insertion of the Mm. subscapularis with converging lines indicating the course of the fibers of this muscle.

The fracture considered in this report is of the evulsion type, as was that of Lorenz. The lesser tuberosity of the humerus is the main point of insertion of the subscapularis muscle, and these relations are shown by Figure 1. With this in mind it is a reasonable inference that sudden strong contraction of these muscle fibers could cause such an isolated evulsion fracture of the lesser tuberosity. The position of my patient's arm and that of Lorenz's patient were similar and puts the subscapularis muscle in a state of contraction conducive to pulling off the lesser tubercle. In this position the arm was at about 90 degrees with the trunk at the shoulder, adducted, and rotated outward, the elbow strongly flexed, the hand above the head, and the palm upward with the wrist extended. Visualization of this posture is aided by imagining the upper extremity of a waiter carrying a food tray, for it is essentially the same as assumed by the two victims of this injury. Held this way, the upper extremity is in a position of protection to parry the strength of the anticipated blow, in Lorenz's patient the blow of a falling heavy iron column and in my patient the forceful impact against the cement floor. In each instance this blow caused a sudden forced outward rotation of the upper arm and in each patient was accompanied at the same instant by an audible crack and severe pain in the shoulder. This last forceful outward rotation of the upper arm results in a final sudden severe stress of the already stretched fibers of the subscapularis muscle and also in the evulsion of the lesser tuberosity of the humerus. Posterior

dislocation of the shoulder as observed by Santee[1] and Jossel[2] in their patients no doubt accentuates the force exerted upon the stretched muscle fibers and the tuberosity as well.

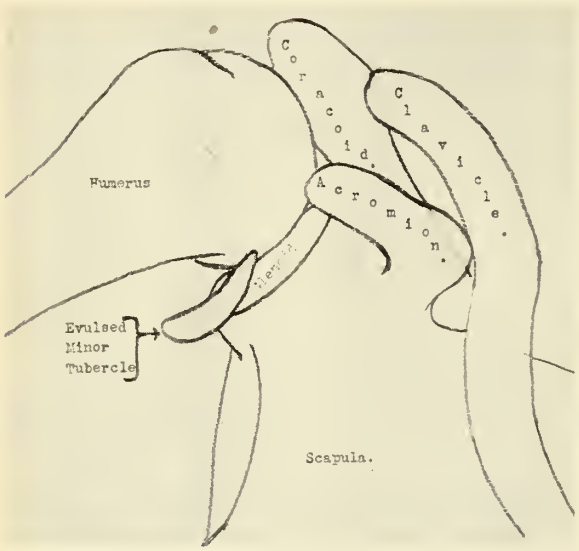


Fig. 2. Exact tracing of one of the stereoroentgenograms showing position of the evulsed tuberosity.

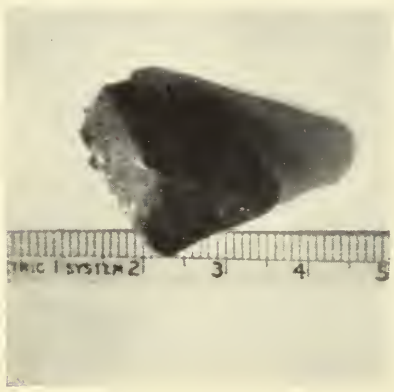


Fig. 3. Photograph of the removed tuberosity of the humerus.

The accident sustained by my patient was a fall, head-first down a ten-foot elevator shaft. This happened on March 9, 1926, when the patient, S. B., was thirty-two years old. He was brought to his doctor within an hour after the accident. The injured shoulder was swollen, red, and painful. Stereo-ray plates made at this time revealed no dislocation or other injury to the bones or joints except the evulsion of the lesser tuberosity as shown by Figure 2, a tracing of one of the stereoroentgenograms. The loose tuberosity is seen displaced well down along the side of the rim of the glenoid cavity.

Manipulative efforts to replace the tuberosity were not successful and a body swathe and Jones' sling were applied. After one week active motion was started but was limited in all directions. After four weeks, because of continued pain and limitation of motion, his insurance carrier's consultants advised operation. On April 5, 1926, under nitrous oxide anesthesia this was performed and the tuberosity freed from a bed of fibrous tissue and entirely removed. Figure 3 is a photograph of the removed tubercle. Recovery from the operation was uneventful and the patient left the



Fig. 4. Photograph showing the limited motion up the back of the hand on the injured side as compared with the opposite hand.

hospital in three weeks. Twenty-five weeks following the accident, he was examined by the State Compensation Commissioners, who allowed him a permanent partial disability of 15 per cent loss of function of the right shoulder. Lorenz's patient received no treatment and from his description the permanent disability was somewhat greater. In Santee's two patients, replacement of the tuberosity was effected by manipulation in one and by operation in the other, but functional results were not mentioned by him. Personal inquiry concerning these two patients brought no further information because of the death of Dr. Santee.

The final result based on the last examination of my patient was estimated in November, 1932. At this time body weight and general physical condition were without change. The injured shoulder was a little smaller than the other and according to a spirit level was about one inch lower. The arm could be raised only a little above the shoulder. The hand could be pushed up the back within six inches of the distance possible with the left, as shown in Figure 4. Lifting was best done with the upper arm against the trunk. Active inward rotation is weak and outward is preternaturally increased by about 25 per cent. In his own words the patient stated, "My shoulder tires easily in any work requiring me to raise my hand above my head, such as painting and driving nails. I cannot shovel or use a pitchfork. My present work is running a power grass-mower. I have no pain."

DISCUSSION

The treatment rendered in this case is recorded. Removal of the loose tuberosity is by no means suggested as a routine procedure in this injury. It is believed that, whenever possible, immediate anatomic replace-

ment of the evulsed process, by closed method or operation when necessary, is the ideal treatment.

The mechanism of this fracture, while open to conjecture, is probably one of extreme stress of the subscapularis muscle as interpreted from the anatomy, the examination, and the history secured from this patient. The case reported by Lorenz supports this contention.

In a personal communication concerning this fracture, Dr. Charles L. Scudder says, "Very little has been written about this type of injury. The separation is ordinarily not great. That position should be maintained that approximates the tuberosity to the shaft most satisfactorily. Operation may, in extreme cases, be considered."

In the case reported, displacement of the tuberosity was very great. At the late date of surgical intervention extensive deposit of fibrous tissue made anatomic replacement impossible. After removal of the tuberosity, the patient had less pain in his shoulder than before.

CONCLUSION

A case of isolated fracture of the lesser tuberosity of the humerus is reported, apparently only the second case to be completely recorded in the literature.

Extreme stress of the subscapularis muscle is advanced as the method of production of this fracture.

The waiter's tray-carrying position is suggested to describe the position of the upper extremity when this fracture occurs. This position was assumed by both the author's and Lorenz's patients.

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"BAD DRUGS AND THE LAW"

Under the title "Bad Drugs and the Law," Arthur Kallet and F. J. Schlink in the *Nation* for October 19 consider three subjects—"Ergot," "Ether," and "Prescriptions." The article on ergot opens with this statement: "For an extra profit of half a cent, American drug manufacturers have helped dig the graves of thousands of women dead of hemorrhage in childbirth." Kallet and Schlink have apparently swallowed, hook, line and sinker, the preposterous and fantastic publicity which the Ambruster clique has been trying to get into newspapers and magazines for several years. This entire matter was discussed in detail in a special article published in The Journal, September 6, 1930, entitled "Ambruster, Rusby—an Ergot." In reference to ether, Kallet and Schlink say: "Next to its toleration of substandard ergot, we know of no more inexcusable and intolerable abuse of public confidence than the negligence and callousness that have characterized the administration's handling of the problem of impure ether sold to hospitals for anesthetic use." The gentlemen fail to support their charges with any good evidence that any patient has been harmed through the administration of substandard ether. On the subject of "Prescriptions," Kallet and Schlink state, in effect, that because of the small number of prescriptions that many druggists have to fill, drugs that deteriorate by keeping are used "month after month, even for years, until the last drop is gone." However, they do not blame the individual druggist for this state of affairs but do blame the "drug and prescription dispensing system which mixes a minor profession with a major business." That substandard drugs have occasionally been sold and are being sold is doubtless true; probably it will continue to be true, in spite of all that officials may do to the contrary. "Substandard" drugs do not necessarily mean deliberate adulteration; drugs are subject to deterioration, variations of crude supply, and similar influences. Much more can be accomplished by finding means to correct the underlying causes than by attempting the quite impossible plan of having the government check every retail sale at every drug store. Fortunately, the great majority of the departures from the official standards are not of such a degree or kind that they menace the health of the purchaser. (Jour. A. M. A., October 29, 1932, p. 1513.)

ESTROGENIC SUBSTANCES: THEELIN

The Council on Pharmacy and Chemistry reports that the introduction into therapeutics of commercial preparations with active estrogenic properties marked what appeared to be a new phase in the treatment of female sexual disorders. These new preparations, unlike those with which the market had been replete for many years, produced striking and concordant effects when injected into animals. Their clinical use spread widely and rapidly, and observations accumulated in profusion. But the early enthusiasm began to wane as it became evident that the therapeutic usefulness of the estrogenic preparations had been greatly overestimated; the effects of injections in human beings were in the great majority of cases neither striking nor concordant; and in those cases, too few, unfortunately, in which an effort was made to control the observations carefully, the results appeared to be even less notable. Despite their extensive employment, the indications for the clinical use of Theelin and related products are at the present time only imperfectly understood. With a view to establishing, if possible, the indications for and limitations of endocrine therapy of this type, a comprehensive review on this subject was prepared and adopted by the Council for publication. Theelin and related preparations have been used in practically all the special ills the human female "is heir to"; even the male has not escaped. The results in general have been quite disappointing, despite the abundance of case reports available, numbering by now several thousand. The place of Theelin and related products in gynecologic therapy remains for the future to decide. Great caution is necessary in the use of these preparations and greater caution in making deductions from it. The indiscriminate use is likely to do more harm than good, not only because of the effect of the preparations themselves but also because general therapeutic measures intended to aid the organism in restoring its own equilibrium are likely to be neglected. The Council believes that the future of endocrine therapy in the sexual sphere appears quite promising; but so far enthusiasm in this case has in large part seriously interfered with clinical judgment; the clinical use has kept far ahead of the laboratory data; controlled observations have been few indeed. It is time to call attention to the fact that most of the basic facts should first be worked out in the laboratory before they are tried in the clinic. —(*Jour. A. M. A.*, April 29, 1933, p. 1331.)

President's Letter

THE Minnesota State Medical Association has just completed the eightieth annual meeting.

This was in point of number in attendance and the amount of scientific material presented the largest meeting ever held by the association. To the committee, Dr. Meyerding and the members of the Mayo Clinic we wish to express our appreciation for this great accomplishment.

Many important matters of medical economics were discussed and some important measures passed by the House of Delegates and the Council, which, I hope, will prove to be forward steps for the profession in Minnesota.

We may congratulate ourselves on the election of Dr. Frank Savage for president in 1934. This was a fitting recognition of his years of unselfish endeavor for the promotion of the welfare of this association, and brings to the head of our organization a man of fine character who is thoroughly acquainted with the complex functions of the society.

Yours truly,



President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

Official Journal Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society.

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Paul Kenyon, M.D., Wadena.....Seventh District
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E. L. Tuohy, M.D., Duluth.....Ninth District

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ALCOHOL REGULATION

Public opinion tends to sway back and forth like the swing of a long pendulum. This has been evident in the attitude of the public to the liquor question.

Liquor has been a problem since the beginning of time and will doubtless always be one, simply because of its effect on the human organism and the frailty of human nature.

There is no doubt in the minds of most thoughtful and observing individuals that strong drink causes much of the world's misery. The world would doubtless be better off without it. That is, however, beside the point. Alcoholic drinks are here and many think they have a place. The solution of the problem lies in education combined with a certain amount of control of the liquor traffic in order to minimize its abuse.

The steady growth in public sentiment in favor of local option and national prohibition led to the adoption of the eighteenth amendment. This seemed to be an expression of a realization of the evils attending the abuse of alcohol and a resentment at the methods of the liquor interests typified by the old fashioned saloon. Idealism and war psychology undoubtedly played a part in the adoption of the amendment, which was enacted in spite of the fact that many believed it did not belong in the Constitution and in spite of the opinion of such statesmen as Taft and Wilson that the amendment would be a mistake. As brought out by the economist, Arthur Twining Hadley, late president of Yale University, no law can be enforced unless an overwhelming percentage of the people favor it. A majority is not sufficient. This truth was well illustrated in the Government's efforts at enforcement of the law. The provisions of the Volstead Act placed the medical profession in a peculiar position, although to some it seemed an enviable one. Alcohol may have some definite medicinal value. For various good reasons many physicians never took out a permit to prescribe liquor. The cumbersome method provided for prescribing, the embarrassment attending a strict adherence to the law outweighed to them the need of a permit. That strict adherence to the letter of the law has been more honored in the observance than otherwise is no great reflection on the profession. The profession has been placed in an awkward position. The intemperate use of alcohol aided and abetted by the profession has been only a drop in the bucket compared to that resulting from bootlegging. It is true that certain physicians have prostituted their profession by deliberately selling prescriptions, but such action is frowned upon by the rank and file of the profession.

It has galled certain members of the profession to be told that liquor may be prescribed medicinally but only in dosage approved by legislation. Our national organization has keenly opposed such restriction as a matter of principle. The recent change in regulations is felt to be in certain sense a triumph for the profession although quantitative restrictions have not been entirely removed.

As a matter of fact the opportunities for abuse

of the privilege of prescribing are increased by the new regulations. The word "bar-tender" used to be closely linked with the idea of a drink. The close association of the idea of a prescription and a doctor has come to be frequently in evidence. It looks as though the situation is not improved by the new regulations.

It behooves the profession to tighten up in their prescription writing with the removal of the restrictions on prescription writing. The solution of the liquor problem has not been reached. While there is evidence that the legalization of beer has already diminished the demand for hard liquor, the problem of the control of the consumption of the stronger drinks still awaits solution.

OF GENERAL INTEREST

Dr. J. H. Rishmiller of Minneapolis has returned to his practice after having spent the winter months in Florida.

Dr. Clarence F. Wohlrabe has moved from Springfield, Minnesota, to Minneapolis, where he is located at Normandale Boulevard and 60th Street.

Dr. Charles N. Spratt, Minneapolis, gave an operative clinic before a joint meeting of the St. Louis Ophthalmological Society and the Section of Ophthalmology of the St. Louis Medical Society in April, demonstrating his operations for cataract and glaucoma.

The Saint Paul Hospital, Saint Paul, Minnesota, closed Thursday, May 3, 1933, after the last patient was removed to Bethesda Hospital. The institution was operated by the Norwegian Hospital Society, Inc., and had occupied the present structure, a former convent, for the past twenty years.

Physicians who visit the Century of Progress Exposition at Chicago this summer are invited to call for information or assistance of any kind at the booth to be maintained by the Chicago Medical Society. The Women's Auxiliary to the society will welcome wives and daughters of physicians.

Dr. William C. Bernstein of New Richland, Minnesota, left on May 9 for a three months' post-graduate tour of Europe. He will be a member of the International Post-graduate Assembly, which will visit the leading clinics of Europe, and will later return to London for the Pediatric Congress. During Dr. Bernstein's absence Dr. Richard S. Rodgers of Minneapolis, who has been a resident in medicine at the Minneapolis General Hospital for several years, will carry on the practice at New Richland.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

INDIAN QUACK PLEADS GUILTY

State of Minnesota *vs.* C. W. Brunelle, alias Chief Little Cloud

On March 30, 1933, C. W. Brunelle, alias Chief Little Cloud, sixty years of age, who resides at 118 Fourth Ave. N. E., Minneapolis, entered a plea of guilty to a charge of practicing healing without a Basic Science Certificate before Judge C. M. Stockton in the Municipal Court at Faribault, Minnesota. "Chief Little Cloud" is a half breed Indian (Chippewa) and is employed by the City of Minneapolis as a garbage collector. During his spare moments, and particularly on Saturday afternoons and Sundays, he has been making a specialty of driving down to Faribault to see a number of patients. In the present prosecution he diagnosed the ailment of one Mrs. Hulda Schuemke as bone rheumatism and left some medicine, making a charge of $7.00, which was paid to him in cash. Mrs. Schuemke, seventy-five years of age, is afflicted with arthritis and has not walked for the past fifteen months.

Mrs. Schuemke also was swindled out of $125.00 by "Reverend" Hawkins, who was convicted in the Rice County District Court in September, 1932, on a charge of grand larceny in the second degree growing out of his "healing" activities.

The State Board of Medical Examiners acknowledges the splendid coöperation shown by Miss Ruth Peterson, School Nurse at Faribault, Mr. James Caswell, Faribault City Attorney, Sheriff Haverland and Thomas H. Quinn, County Attorney of Rice County.

MISCELLANEOUS

VAGINISMUS

Spasm of the levator ani muscle, accompanied by pain and closing the vaginal orifice is not uncommon. It not infrequently is caused by conditions not immediately ascertainable.

The following procedure has afforded patients immediate relief of symptoms and has facilitated later study.

Usually the tender area is in or near the fourchette. This is touched with phenol and a small wheal is immediately produced with the injection of 1 per cent procain by means of a fine needle. If done carefully no pain is experienced. Then from this wheal as a center a fan-shaped area in the introitus and floor of the vagina for a distance of an inch is injected with the same solution. The patient experiences relief at once and relaxes. This same area is injected with a 2.5 per cent solution of quinine urea hydrochloride using not over 2 c.c. and spreading it very evenly.

The surface under the injected area immediately becomes anesthetic and remains so for about a month. The small amount of scar tissue resulting is apparently of no moment and does not apparently predispose to future lacerations during childbirth. Normal sensation slowly returns and in the meantime necessary treatment can be carried on.

This method has been used many times and without any undesirable after-effects and gives relief from a disagreeable phenomenon and one frequently a cause of much unhappiness.

O. I. Sohlberg, M.D.

NEOCAINE

One original package of Rachi-Néocaine Corbière (Laboratoires Pharmaceutiques Corbière, Paris; Sole U. S. Agents, the Anglo-French Drug Company, Inc., New York) was submitted to the A. M. A. Chemical Laboratory for preliminary examination. Qualitative tests indicated the presence of procaine base (para-aminobenzoyl-diethylaminoethanol) and chloride. On thermal analysis the specimen was found to be identical with procaine hydrochloride U. S. P. Neocaine appears therefore to be the French proprietary name for procaine hydrochloride. The product has not been submitted to the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies. (Jour. A. M. A., January 21, 1933, p. 210.)

OBITUARY

Dr. Norman Dreisbach

1867-1933

Dr. Norman Dreisbach, 65, former head of the old anatomy department at Hamline university, died Saturday night, April 29, 1933. Dr. Dreisbach, who was head of the department before it became associated with the University of Minnesota medical school, died following a stroke suffered Wednesday night. He had been a practicing physician in Minneapolis since 1896.

Graduated from the College of Physicians and Surgeons at St. Louis, Mo., in 1894, he practised two years in Inka, Ill., before coming to Minneapolis.

Surviving him are two sisters and one brother, living in Illinois.

Dr. Emil S. Geist

1878-1933

Dr. Emil S. Geist, fifty-five years old, one of the best known practitioners of orthopedic surgery in the country, died suddenly Sunday, May 14, 1933. Death came shortly after six a. m. at his home, 2904 West River Road, Minneapolis, Minnesota. He expired a few minutes after the arrival of his nurse, Miss Afra Schindler, whom he had previously called.



DR. GEIST

Dr. Geist had just returned from an orthopedic conference in Washington, D. C., Mrs. Geist and one daughter returning by motor.

Born in St. Paul, Minnesota, May 9, 1878, Dr. Geist took his degree as Doctor of Medicine at the University of Minnesota in 1900. After serving one year in St. Joseph's Hospital, St. Paul, Minnesota, as interne, he spent three years abroad in post-graduate work in Paris, Breslau, and Vienna. In Breslau he was associated with the famous surgeon Mikulicz, at which time also the eminent Sauerbruch was connected with the Mikulicz Clinic, and in Vienna he studied with Dr. Adolf Lorenz. Upon his return from study abroad, Dr. Geist entered the practice of orthopedic surgery in Minneapolis, Minnesota, where he practiced until the time of his death. In 1911 he married Miss Augusta Ohage, daughter of Dr. Justus Ohage of St. Paul, Minnesota.

During the World War Dr. Geist was commissioned lieutenant in the Medical Corps of the United States Army. Later he was promoted to captain and then to major. He conducted the schools of orthopedic surgery at Fort Oglethorpe, Ga., and Fort Sam Houston, Texas.

The Hennepin County Medical Society elected Dr. Geist its president in 1928. The Minnesota Academy of Medicine elected him president in 1931. Dr. Geist was a Fellow of the American College of Surgeons. He was a charter member of the International Orthopedic Society, which was organized in London in 1928. He was a member of the Minnesota Pathological Society, the Alpha Kappa Kappa Medical Fraternity, and of the Minneapolis Club.

Since 1928 Dr. Geist had as a partner Dr. Myron O. Henry in the practice of orthopedic surgery. This partnership was dissolved January 1, 1933, at which time he re-entered independent practice.

His survivors are his wife, Augusta Ohage Geist; one son, Justus John; and two daughters, Annamarie and Louise. He is also survived by two brothers, John M. Geist and Dr. George A. Geist, of St. Paul, Minnesota.

Dr. John W. Bell

1853-1933

In the death of Dr. John W. Bell Minnesota has lost one of her oldest physicians, and a man beloved by all with whom he came in contact. For nearly twenty years he had a struggle against ill health but bore it bravely and without complaint. The end of his struggle came on May 16, 1933. It was fortunate that his many friends in the Hennepin County Medical Society, and throughout the State, had learned that on March 18 of this year Dr. Bell had reached the age of eighty years, and friends in the medical profession took this opportunity to express to him by letters, by postal cards, and in many other ways, their appreciation for his service to medicine in Minnesota, and for the fine qualities of his character.

Mrs. Bell, to whom as Kate M. Jones he was married on November 11, 1890, shared with him in this avalanche of tributes.

Reviewing with the utmost brevity that portion of his career of interest to the medical profession, we find that he was born in Butler County, Ohio, March 18, 1853. He graduated from the Ohio Medical College in Cincinnati in 1876, following this with a long period of preparation by post-graduate study in Germany, where at that time many of the leaders in medical thought and research held teaching posts. He began his medical career in Minneapolis in 1882, became Professor of the Theory and Practice of Medicine at the Minnesota Hospital College in 1886, and was made Professor of Physical Diagnosis and Clinical Medicine at the Medical School of the University of Minnesota at its opening in 1888. He was made Professor Emeritus in 1916. Thus during the thirty most active years of his career he played a distinguished part in the training of the many men who passed through the school during that most brilliant period in its development.

He was visiting physician at Northwestern Hospital and consulting physician at Swedish, St. Mary's and Asbury Hospitals. Although his counsel was widely sought he made no parade of his ability. Without lessening in any degree the force of his opinion his tactful and courteous consideration for a fellow physician made him an ideal consultant.

A Democrat in politics, he served in the Minnesota State Senate from 1891 to 1895. He was appointed and re-appointed many times on the Minneapolis Charter Commission.

He was an honorary member of the Minnesota Society of Internal Medicine and had served as President of the Hennepin County Medical Society, of the Minnesota State Medical Association and the Minnesota Academy of Medicine. However, the service which undoubtedly gave him the greatest satisfaction was as the medical member of the Hennepin County Sanatorium Commission for a period of ten years from its inception until his resignation in 1919. On that Commission the value of his counsel was felt from the first and to him is due in very large measure the remarkable development of, and the sound medical policies characterizing, Glen Lake Sanatorium.

As evidence of the esteem in which Dr. Bell was held by his colleagues in Minneapolis, where he had practised for more than fifty years, we take the liberty of quoting from an appreciation written for his eight-

(Continued on Page 443)

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Repeal for Doctors

By contrast to the general rush for beer in April there was no "first day" rush for medicinal liquor on Monday, May 8, when prohibition restrictions were at last lifted from the doctor, and liquor for medicinal purposes could be prescribed, again, in unlimited quantities.

Some few druggists in large down-town drug stores, according to the newspapers, attributed the non-appearance of an increased demand to the fact that physicians had not received official instructions regarding the operation of the new law on May 8.

Official instructions were published in the newspapers in ample time in advance, however, for any who wished to take advantage of the first day of license.

It is a credit to the medical profession that the law should have gone into operation without celebration or untoward incident.

There is no doubt whatever that racketeers and bootleggers, deprived of spiked beer revenues, will lay siege to the doctor in the hope of establishing themselves anew in the liquor business. Great will be the temptations held out to those whose prescription will release from bond, whiskey enough to last any patient for thirty days and some for ninety days. There will be schemes for producing fake patients that look government-agent-proof. There will be a chance for the physicians who abused the restricted privileges under former legislation to prejudice the public irremediably against the entire medical profession.

The average physician honestly believes that many of his patients will be benefited by use of whiskey and other medicinal liquors, under direction. He believes still more firmly that the physician should be under no restriction, whether as to medicinal liquor or any other therapeutic agent, when it is a question of doing what he thinks best for his patient. He is further irked by the necessity of filing, for the information of a government office, facts about the patient's health which his ethics demand should remain a confidence between himself and his patient.

Removal of these restrictions is a public recognition of the responsibility and trustworthiness of the medical profession. Abuses of this trust will not occur among the rank and file of physicians.

Beyond any doubt there will be individual violations among physicians. But they will be more deeply resented by colleagues in the profession than formerly when all felt the annoyance of arbitrary and unjust rules. The good name of the profession is at stake now as it never was in the past—as far as liquor violations are concerned. Honest physicians will be justified in watching closely and jealously lest the professional honor of all be smirched.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:30 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of June will be as follows:

June 7—The Heart in Infections.
June 14—Environmental Medicine.
June 21—Cause of Anemia.
June 28—Periodic Health Examination of Men.

AMERICAN PROCTOLOGIC SOCIETY

The American Proctologic Society will hold its thirty-fourth annual meeting in Chicago, Monday and Tuesday, June 12 and 13, 1933. Headquarters will be at the Stevens Hotel. The time and place of meeting will enable members to attend the American Medical Association meeting in Milwaukee, June 12 to 16, and also the Century of Progress exposition in Chicago.

HENNEPIN COUNTY MEDICAL SOCIETY

At the annual meeting of the Hennepin County Medical Society held May 3, 1933, the following were elected to office, terms to begin October 1, 1933:

Dr. C. A. Stewart was elected president, Dr. Martin Nordland was named first vice presiednt and Dr. Olga S. Hansen second vice president. Committee members were named as follows: Dr. R. R. Cranmer and Dr. H. W. Aurand, executive; Dr. D. O. MacDonald and Dr. F. J. Pratt, board of censors; Dr. S. Marx White and Dr. A. T. Mann, board of trustees, and Dr. H. L. Ulrich and Dr. E. L. Gardner, ethics.

Delegates to the annual convention of the Minnesota State Medical Association are Dr. Moses Barron, Dr. Erling W. Hansen and Dr. C. R. Drake, with Dr. J. S. Reynolds, Dr. E. A. Loomis and Dr. Ivar Sivertsen as alternates.

REDWOOD-BROWN COUNTY SOCIETY

The annual meeting of the Redwood-Brown County Medical Society was held at New Ulm, the evening of May 8. The meeting opened with a dinner for physicians and their wives at the Methodist church with Dr. W. A. O'Brien as dinner speaker, his subject "Quacks." Following the dinner the physicians held their scientific and business session at the home of Dr. George F. Reinecke. Dr. O'Brien spoke on Hematology and Dr. R. E. Scammon, Dean of Medical Sciences at the University of Minnesota, on Medical Economics. Mr. T. E. Flinn of Redwood Falls and Mr. Robert Ochs, also of Redwood Falls, discussed collection problems. New officers elected at this meeting were Dr. Albert Fritsche, New Ulm, president; A. P. Goblirsch, Sleepy Eye, vice-president; W. A. Meierding, New Ulm, secretary-treasurer; O. J. Seifert, New Ulm, censor for three years; E. J. Wohlrabe, Springfield, and F. C. Gibbons, Comfrey, delegate and alternate, respectively. The women held a session of the Auxiliary at the home of Mrs. George Weiser.

SAINT LOUIS COUNTY SOCIETY

The St. Louis County Medical Society met at Nopeming Sanatorium Thursday, May 11, 1933. The following program was presented:

4:00 P. M. Clinics, Hart Building

1. Result of the Treatment of Tuberculosis in Adult Patients—Dr. J. G. Lamont
2. Examples of Tuberculosis in Families—Dr. G. A. Hedberg

6:00 P. M. Dinner, attended by members of the Women's Auxiliary.

1. Special Address: The Modern Treatment of Tuberculosis—Dr. E. S. Mariette, Superintendent of Glen Lake Sanatorium
2. Appendicitis and Tuberculosis—Summary of a Series of Cases—Dr. Lincoln Steffens
3. Prevalence of Tuberculosis among Nurses—Dr. Roy Mayne
4. The State-wide Tuberculosis Program—Dr. A. T. Laird.

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

About forty-five doctors attended this meeting.

The semi-annual meeting of the Southwestern Minnesota Medical Society was held at Lakefield, Minn., Tuesday, May 2, 1933, at 7:30 p. m., at the Masonic Hall.

A short business session was held preceding the scientific program.

"Diverticulum of the Gall-bladder," a case report, was given by Dr. A. L. Pertl, Windom, Minn.

Dr. N. O. Pearce, President of the State Medical Society, presented a talk and a moving picture film on "Diseases of the Nervous System in Children." He also discussed the State Medical Association.

The Auxiliary held a meeting at this time also.

OBITUARY

(Continued from Page 441)

ieth birthday, and printed in the *Bulletin of the Hennepin County Medical Society,* April 10, 1933.

"Those who have had the pleasure of reading William Macmichael's delightful account of 'The Gold-Headed Cane' will remember that this cane first appears in history in 1689, in the hands of Radcliffe, the great London physician, as he is attending a consultation at the illness of King William III. Radcliffe gave the cane to Mead and it passed on then to Askew, Pitcairn and Baillie, who died in 1823. It had thus become a sort of badge of office in succession to the great royal physicians and consultants of London. This cane rests now in a glass case in the Library of the College of Physicians of London, having been deposited in the new building of the College the day before its opening on June 25, 1825. If such a cane could be thought of as a symbol of leadership, and of profound regard on the part of the medical profession for its bearer, we would award it to our Dr. Bell as the royal physician and consultant of Minneapolis and of the State at large as well, and we leave him in possession of this intangible but no less real token of our confidence and esteem, which we hope he and Mrs. Bell may live long to enjoy."

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD APRIL 6, 1933

The President, Dr. Kenneth Bulkley, in the Chair.

CONGENITAL CLEFTS AND SCARS FOLLOWING BURNS

Dr. Harry P. Ritchie, St. Paul (by invitation): The ten beds for Reconstruction Surgery at the University Hospital have been kept pretty well filled, not so much by a large turnover of patients, but because so many of my patients and those of Dr. Waldron and Dr. Leven require long hospitalization and more than one operation. A close study of the general condition of the patient and specific state of the operative field often leads to a postponement of any attack or to some partial or preliminary step.

The cases include congenital defects, the end-results of burns and other injuries of the superficial tissues. Some part of the work may be called cosmetic surgery, but so far this term has been confined to gross deformities due to traumatism or disease. A large part of the work still is in the field of the congenital clefts of the face and jaw.

I present two cases of this deformity, both of them double hare lip and cleft palate. Each case shows all of the possible clefts that may occur. Any other cases would present merely different degrees and combinations of clefts.

The greatest difficulties and the most variable results have been experienced in the alveolar process cleft. What to do for this cleft in the bone has received a great deal of discussion. The several plans of repair are covered by this first case. At the first operation, a section of the vomer and septum was removed near its root, the pre-maxilla was then pushed backwards by thumb pressure and an adhesive strap applied to the face to hold the parts in contact with the lateral processes and splint the vomer. In six weeks or so the pre-maxilla appeared to project as far as it did before this treatment. At the second operation a circumferential wire was applied, removed in four weeks with conditions about the same as formerly. Now is shown a third attempt which is that the front part of the palate has been done on one side by the use of a vomer flap and one side of the double lip done at the same sitting. The result has brought the pre-maxilla in contact with the lateral but at the expense of some rotation of it towards the repaired side. It is my experience, however, that this rotation will be corrected when the other side is similarly repaired. Case 2 presents the same combination of defects, the clefts being much less in degree and so in this case the pre-maxilla was replaced by section of the vomer and the adhesive strap applied with the result that the pre-maxilla was nicely replaced with a minimum amount of damage to the child.

The double hare lips have been operated upon in several ways. The plan of separate attack was used in each of these cases. To do both sides at one sitting is quite an undertaking. I have found it possible to bring the muscle elements of the maxillaries to the midline of the prolabium at each sitting, so that it is thereby possible to imitate nature's plan of migration of these elements in the formation of the normal lip.

There has been a very definite improvement in the nostrils postoperatively because I have now demonstrated that there is reflection of the lateral nasal process out on the body of the lip in the complete clefts. This reflection covers the upper muscle elements. Unless these elements are exposed by the elevation of this flap, it may become interposed between the right and left muscle bundles. The result is a double width nostril: the flat and flaring ala with which we are all familiar. Since the demonstration of this reflection our nostrils have shown great improvement. In both of these cases the flaps have been turned into the nostril.

The age at which these babies should be operated upon depends upon the alveolar process cleft and particularly upon its degree. It is necessary to apply some force to close it, as early as possible, compatible with the condition of the child. I have recently looked over the charts of a considerable number of babies operated upon and find that the incidence of cleft process is about 72 per cent of all cases. In about one-third of these cases, I have used a wire preliminary to the lip repair or inserted at the same sitting. In the others the lip was done over the cleft with the expectation that its action or the weight of tissue acting on the bones would close the cleft. My experience with the wires is that they can only be considered as preliminary to lip closure. They are not primary agents, but secondary, because as exemplified in the first case, nothing has really happened to the process cleft until the lip was operated upon. So that in every way we are trying to exclude the use of the wires and get these cleft process cases early when it may be possible to close the cleft by thumb pressure, adhesive strap and the early lip repair, as shown in Case 2.

The palate closures are being postponed to late in the second year. Early repair has been urged to provide for the development of normal speech and often these clefts have been attacked at a time when the development of the tissues invites failure. We are paying more attention to seasonal selection of the time of operation and have postponed several cases until the weather moderated and the chance for infections was minimized.

In the review of my series, the soft palate cases showed a 97 per cent primary union. In the hard palate cases the chance of complete success is only two out of three. This comparison of the two clefts shows an enormous difference. I believe this is due to the possibilities of infection in the suture line in the inactive tissues of the hard palate. The hard and soft palate cases therefore are now being often postponed until the age of two years or more.

In several cases of the double hare lip palate, the hard palate has been repaired and the soft palate left for a future attack six to eight months later. Under this program the hard palate line has always healed because there is wide drainage of the space between the flap and the bone. The sequence of operation is much better than the soft palate first and hard palate later. I believe that there is only one cleft that requires early treatment, namely, the alveolar process cleft.

Case 3 is that of a man with contracting circular scars of both wrists following gasoline burns. On the right wrist the scar was very thick, resistant, and so contracted as to produce symptoms both subjective and objective in the hand and fingers. On the left wrist was a similar state but of less degree. I decided to treat the wrists differently. On the left two incisions were made on the back of the wrist. The scar tissue between them was undermined, loosened from the underlying parts and a full thickness skin graft inserted in the cuts with a perfect take. On the right wrist an abdominal flap was mapped out and gradually elevated. The back of the wrist was dissected, the scar tissue removed, the hand inserted under the lower end of the flap, which was sewed to the wrist for about half of its circumference. Later the lower end of the flap was severed from the abdomen, more scar removed and this end sutured in position. When it was evident that the flap was well healed to the back of the wrist

and that the upper end of the flap was obtaining blood supply from the wrist, it was by successive steps severed above. The uncertainty of loss at this distal end led me to simply anchor the flap and apply heat because after such elaborate procedures it is most discouraging to find that some part of the work is incomplete. We had here two methods of treatment, one a very simple but apparently effective method consuming but little time and effort, the other very elaborate and requiring most exacting care.

In Case 4 the left hand was severely burned in an automobile accident. A granulating surface appeared which was covered with a Thiersch graft. The take was complete with tissues movable. The fingers were in extension and it was decided to flex them by cutting the scar tissues on the back of the hand. To fill in the defect a full thickness graft was placed with an apparent take.

PRESENTATION OF A GROUP OF PLASTIC CASES

Dr. Carl M. Waldron and Dr. N. Logan Leven, Minneapolis (by invitation):

Case 1.—Extensive burns of face and hands in a male, aged forty, November, 1931.

A. Restoration of all four eyelids by the overlay method of skin grafting: This patient showed the most extreme ectropion of the lower eyelids I have ever seen. The exposed conjunctiva of the left lower lid extended down upon the cheek for 1.5 inches and the tarsus could not be palpated. The right conjunctiva extended down on the cheek for more than 1 inch. Incisions were made approximately 1 millimeter below the lower border of the conjunctiva and the entire exposed conjunctiva was undercut and hinged upwards to lie against the globe; over the raw surface thus exposed a dental impression compound mold was fitted and a Thiersch razor skin graft was cut and sutured over the raw area. The dental compound mold was again placed in position and held filmly against the graft by means of an adhesive pad and pressure bandage. This procedure was carried out for all four eyelids. In these cases there is a subsequent contraction of the sub-epithelial connective tissue which decreases the height and width of the graft producing a slight recurrence of the ectropion. This usually necessitates a second graft or at times a third. These are usually best inserted between the upper border of the previous graft and the lid margin by again incising and undercutting and fitting a dental compound mold.

B. Transfer of skin from abdominal wall to dorsum of left hand: After excision of scars the hand was slipped under a double ended flap and after the skin had healed upon the hand it was freed from the abdominal wall by delayed incisions in order to make sure of the blood supply.

C. Tube flap carried from chest to left cheek for the purpose of restoring the skin of both cheeks and chin: Stage 1. A skin flap 3.5×11 inches was raised through horizontal incisions. One incision was not carried through for a distance of 2 inches at its midportion in order to provide a blood supply to the central portion of the skin in addition to the blood supplied by both ends of the flap. The flap was sutured on its under surface to form a tube. The margins of the wound on the chest wall were widely undercut and sutured beneath the free flap. About ten days later the midportion of the flap was divided from the chest wall. After two and a half months the lower end of the flap was incised and undercut in several stages to make sure the blood supply was adequate before the transfer to the left cheek. A portion of the scar was excised on the left cheek and the flap sutured. It has united without any complications. Further scars will be excised from the cheek just beneath the new attachment and the flap will be incised and unfolded in order to secure an adequate new blood supply before undertaking the incision and separation of the attachment of the chest. This will be carried out in several stages.

Case 2.—Extensive burns of face, arm, chest, and back—followed by extreme contraction of the right arm at the elbow and anterior-axillary fold with hypertrophic scars in a female, aged twenty-six, December, 1931.

A. Stage I. Scar excision of the hypertrophic scars, undercutting and plastic readjustment of the anterior-axillary fold. There remained a marked deficiency of skin to cover the anterior surface of the elbow and even with quite deep dissection the arm could not be extended normally.

Stage II. The flexion contraction was corrected by manipulation and application of moulded dorsal plaster splints. These were changed at five to six day intervals, five splints being used.

Stage III. Granulation tissue and scars excised from the antecubital space February 23, 1933. A flap was raised from the right side of the body, carried over on to the anterior surface of the elbow and sutured in place. March 23, 1933, following several delayed incisions of the base, the flap was completely separated from the body wall and its margin sutured to the arm.

Case 3. Extensive burns of the face and hands in a female, aged nineteen, December, 1930.

A. A hypertrophic scar over the bridge of the nose was excised and a full thickness skin graft cut to measurement and sutured in position. This was covered by a dental compound mold.

B. Scars on the dorsum of the left hand and fingers were excised and the hand buried beneath the abdominal skin into a pocket undercut as close to the skin as possible. The pockets for the fingers were designed to maintain the fingers as widely separated as possible. The finger tips protruded through small incisions and were steadied by silk worm gut sutures through the finger nails. Beginning two weeks later the skin between the fingers was incised to free the fingers and later the skin on the inner margin of the hand was incised to free the hand. One month after the hand was buried, the skin on the thumb side was incised and the hand freed from the abdominal wall. The abdominal wound was incised and by suturing the defect was diminished. At a later date a thick razor graft was placed upon the granulation tissue with a successful take. Small pinch grafts were also used.

C. Procedure for the right hand was carried out in the same manner; a greater amount of skin being taken to replace the skin of the thenar eminence.

The excess subcutaneous tissue is being removed from time to time from the skin of the fingers and hand in order to assure an adequate blood supply. The function of the hands is much better than before the transfer of the skin and will no doubt improve.

SOME REMARKS ON CARCINOMA OF THE RECTUM AND OTHER TYPES OF MALIGNANCY

Dr. William T. Peyton: The two-stage operation for carcinoma of the rectum as described by F. W. Rankin (Surgery, Gynecology and Obstetrics, 53:670-675, November, 1931) is the operation now most frequently used at the Minnesota General Hospital for removal of carcinoma of the rectum. Since this operation was first performed here, approximately sixteen months ago, forty-three patients with carcinomata of the rectum and one with a lymphosarcoma have been examined. Three of these patients had a recurrence following a previous operation for removal. Two others refused operation. In one a colostomy and posterior excision was done. Eleven of the remaining thirty-seven patients were operated upon by the two-stage operation referred to above. The other twenty-six patients were considered to be inoperable. In the recent cases of the series (ten in all), the liver was

visualized by intravenous injection of a 25 per cent suspension of thorium dioxide followed by the taking of x-ray plates of the liver. In six of these cases, metastases to the liver were demonstrated by this means.

Some minor modifications of the operative procedure described by Rankin have been made. High voltage x-ray therapy is given after the first stage operation because it is believed that this should prevent metastases before the second stage of the operation is performed.

There were two postoperative deaths in the eleven patients operated upon. These were both improperly selected for this operation. One died of peritonitis, the other of pneumonia. One other patient has already died of recurrence.

It is important to remove all the perirectal tissues in cancer of the rectum by sharp dissection. This excision should include a wide removal of the perianal skin, the contents of the ischio-rectal fossæ, and all of the posterior part of the levator ani muscle, cutting it at its origin from the arcus tendineus.

Two other cases previously reported before this society were presented. One of these was an hemangioendothelioma primary in the region of the right scapula with pulmonary metastases present when presented before this group a year ago. He received a series of x-ray treatments then and at this time no persistence or recurrence of the lesion can be demonstrated. The other patient was an instance of multiple myeloma in whom only a single lesion involving the sixth thoracic vertebra could be demonstrated in October, 1930, when first examined and treated by laminectomy and radiation. A complete paraplegia which was present at that time cleared up entirely, but in the past few months he has developed multiple painful areas throughout the body. X-ray films demonstrate a most advanced destruction of the various parts of the skeleton by myeloma at the present time.

AMBULANT TREATMENT OF HERNIA

Dr. Arthur T. Bratrud: In presenting a preliminary report of the ambulant treatment of hernias, time will permit only a presentation of a few of the impressions and opinions gained from nearly two years experience with this form of treatment. Whenever this form of treatment has been mentioned, it always conveyed the impression that it was, had been, and is still being done only by quacks. As far as can be determined, the history of this type of work dates back to 1835, when Velpeau first thought of the idea and successfully treated several patients. Among the various types of solutions used from that time, may be mentioned tincture of iodine, tincture of cantharides, fluid extract Querqus Alba, tannic acid, paraffin, zinc sulphate, carbolic acid and alcohol.

A review of the literature on this subject was rather discouraging to any attempt at carrying out this procedure before finding an article by Fraser and Hall of Bellevue Hospital and the New York University, where in 1929 they injected a few hernias and carried out some experimental work on monkeys and dogs. They reported very nice results on these hernia cases. In both the practical and experimental work they used the so-called Pina Mæstro solution, the basic principle of which consists of tannic acid. Reports of their experimental work showed that the indurated area at site of the injection showed a vigorous proliferation of the endothelial and connective tissue cells, plus large mononuclear phagocytes and few foreign body giant cells. There was no necrosis present. There is no doubt in my mind that the injection of paraffin which was so popular about 1880, and is being performed occasionally at the present time, did a great deal to discourage this form of treatment, and caused it to fall into disrepute. About the year 1880, Billroth made the statement that if a solution could be obtained, that caused the artificial proliferation of tissue, the radical surgery of hernia would be solved.

For all types of hernias, the injection treatment is not amenable. Post-operative or incisional hernias usually have adhesions or incarcerated abdominal viscera, without any definite sac, and should not, as a rule, be treated. Incarcerated or irreducible hernias should not be injected on account of the danger of strangulation. This is a distinct surgical condition and should be treated as such. Hernias that can not be reduced and held reduced or where the symptoms cannot be completely relieved by proper application of a truss or surgical. Neither should sliding or direct hernias be considered proper cases for treatment, until we have had further experience with this method. Neither should any hemophiliac or any other case where there is a definite surgical contra-indication be considered for this form of treatment.

Statement has been made that about 12 per cent of all people are suffering from hernias and that 80 per cent of all hernia sufferers are wearing trusses. From our experience, I think it is safe to say that probably one out of ten who wear trusses has symptomatic relief or is properly fitted. One type of truss will not fit all individuals. The most satisfactory truss that we have found is a spring form. When properly fitted this gives relief and is not an inconvenience at any time, regardless of whether the patient is engaged in work, athletic exercise or play. Trusses have usually been fitted too low, and the result is that it has held the hernia contents up, but not within the abdomen. When so fitted, it causes the hernial contents to press out against the fascia of the external oblique muscle and results in a fraying or thinning out of the fascia, as well as an enlargement in the defect in the transversalis fascia. The requirements for any truss are that it remains where it is put, keeps the hernia reduced by a constant, firm and continuous pressure, prevents protrusion of any abdominal contents, and is comfortable. Measurement for a spring truss is taken 2 cm. below the crest of the ilium and down to the symphysis pubis. It is usually necessary to fit a truss several times before absolute comfort and a satisfactory result are obtained. The proper fitting and wearing of a truss requires observation at least every two months to be certain that it is fitting properly. Absolute coöperation of the patient in wearing the truss is absolutely essential. A proper fitting truss should be of no more inconvenience than a well fitting glove after the first few days.

Numerous objections have been mentioned and should be considered. The paraffin injection can be discarded without further discussion. The fact that this type of work has only been in the hands of quacks is not a good argument, as it was not so many years ago that reputable medical men were severely criticized for injection of hemorrhoids or varicose veins and today these procedures are both accepted and recognized. Numerous complications are reported in the literature. These have been reported mostly from the injection of absolute alcohol. As we have had no experinece with this I can say nothing on the subject. Another objection is the fact that a truss must be worn for a long period, but, as I previously stated, a truss is no more inconvenient than a well fitting glove. The truss can be discarded after a period of six months, but in some cases it can be discarded after a shorter period of time than this. Large or double hernias may require a longer period of time. Complications such as hydrocele, epididymitis, orchitis, sepsis, strangulation, peritonitis and abscess have been mentioned, but to date we have had none. There has been a swelling of the cord in a few cases and this has occurred usually toward the end of the treatments, but has caused no serious disability. The production of sterility must be considered, but only time will answer this. As to late strangulation of hernia being more apt to occur, I do think this is possible.

There is a definite technic required in treating these cases which is not difficult to learn, after having seen

a few cases so treated. The number of treatments vary from two to as high as twelve or fourteen. I am skeptical about the large scrotal hernias remaining cured, but to date they apparently are in good condition. The first treatments are given at the internal ring usually at biweekly intervals. As the needle in introduced through the fascia and to the region of the internal ring the tip of the needle can be rotated freely and easily, when in the proper location. The guide for introducing this needle is 1 cm. above the mid-point between spine of the pubis and the anterior superior spine of the ilium. Injections are given at the internal ring, just below the fascia and at the mid-point of the canal. The amount of solution injected varies from two to eight drops of a fluid consisting of Lloyd's Specific Tincture of Thuja 25 parts, alcohol 25 parts, and phenol 50 parts. Injections should be made very slowly, as otherwise pain will result. There is usually slight pain felt for a few seconds after the injection is commenced, but it subsides rapidly. The truss should be worn night and day for the first ten days or two weeks, and then should be worn during the day for probably a period of six months.

The advantage of this form of treatment is that it is ambulant. Complications such as mentioned have not been experienced or substantiated to date. The patient continues working and is not confined to the hospital or incapacitated for a period of six to twelve weeks. As far as statistics show at the present time I believe that recurrences will be fewer than those following operation. The economic side of this form of treatment is very important at the present time. It rescues the mechanical treatment of hernias from the hands of those who know nothing of diagnosis, anatomy, and pathology and little of proper treatment and honest intentions, into the hands of ethical and competent physicians and this is where the mechanical treatment of hernias should be.

A brief résumé of cases treated is here given.

In one hundred and eighty-one hernias in one hundred and forty-one patients, there have been four recurrences. One recurrence was in a man eighty years of age, who had previously been operated upon, and at the beginning of the treatment he had a scrotal hernia which was the size of a large orange. Another was in a patient with a recurrent hernia, who gained twenty-five pounds in weight while in the hospital receiving malaria treatment for lues. Both the other failures were in recurrent direct hernias that occurred after closure of an indirect inguinal hernia. I might mention that one of them developed a left indirect inguinal hernia after closure of the right side and then later developed a small direct hernia on the right side. Injections were repeated in all these cases, and as far as is known, they are apparently cured at present. There was one absolute failure. This was in a short fleshy man seventy-two years of age, who did not adhere to a reducing diet while his truss was being adjusted, and we did not diagnose a direct hernia. A large number of patients are at present under treatment and we are trying to check all of them every two months for at least two years. Patients with contra-indications are referred to the hospital for operation. Very few patients have been refused treatment on account of lack of attention to the proper wearing of their trusses.

CONCLUSIONS

1. The injection treatment is a safe and effective method in eradicating certain types of hernias.
2. Coöperation of the patient in the proper wearing of a truss is necessary.
3. Knowledge of proper fititng of trusses and the technic of the injection treatment is absolutely essential.
4. The occurrence of reported complications has not to date been encountered, except where hernias have been injected in the presence of definite contraindications.
5. The injection treatment of hernia takes the mechanical treatment, when indicated, from the hands of those who know nothing of diagnosis, pathology and anatomy, into the hands of physicians who should know this form of treatment.

THE INJECTION METHOD IN THE TREATMENT OF HERNIA

Dr. Frank S. McKinney, Minneapolis (by invitation): In August, 1931, Dr. Bratrud introduced into the University Dispensary the practise of injecting indirect inguinal hernias supplemented by the wearing of a truss. After several months' use of the method, a number of hernias (including several of the recurrent type) had disappeared without complication or accident. We then decided to investigate the nature of the tissue reaction which follows injection.

The solution was injected weekly for seven weeks into the inguinal region of a dog. Sections were made and examined by Dr. E. F. Bell. They showed the formation of a very fibrous young connective tissue without necrosis, hemorrhage, nor leukocytic exudation. It penetrated adjoining muscles and appeared to be firmly attached to them.

From this report and from the results in patients (diminution in the size of the ring and ultimate disappearance of the hernia) we concluded that the injected material acts as an irritant which produces new connective tissue and thus obliterates the hernial ring. The truss holds the viscera out of the canal during the formation of the scar until it has become firm and strong. The number of injections and the length of time during which the truss must be worn depend upon the age of the patient, the size of the hernia, the character of the tissues about the inguinal canal, and the faithfulness with which the truss is worn.

The following criticisms of the method have been offered: (1) It is a blind procedure; (2) the wearing of a truss is said to make operation more difficult; (3) there is danger of injecting into the bowel, the omentum, the peritoneal cavity, or the large vessels. We have seen none of these complications.

The injection can be made with great accuracy if the location of Poupart's ligament, the internal and external inguinal ring, the femoral artery and vein, and the anatomy of the abdominal wall are kept in mind. Should a recurrence of the hernia develop after the truss has been discarded only a small number of injections are necessary to build up the area where the defect has developed. So far we have not had to resort to operation (to my knowledge) either from inability to complete a cure or because of strangulation while undergoing treatment. I speak of this advisedly and not boastfully.

Speaking before the Interstate Post Graduate Medical Association of North America held in St. Paul in 1925, Dr. Bevan of Chicago said that it is clearly our duty to become very familiar with the use of the truss. The truss is still a means of treating hernia and it is used whether we like it or not in a great many cases. I find among my students and among my younger assistants today the tendency to brush aside the truss, and to pay little attention to it. This is a mistake because in infancy it is curative in more than 50 per cent of the cases.

The usual type of bubonocele offers the most promising indication for this treatment. Very large scrotal hernias (indirect) can be cured provided they are reducible and provided both the surgeon and the patient realize how long a period of treatment will be required. It is but natural to ask ourselves why this method which we have found so satisfactory and free from complications should have fallen into such general disrepute. The answer, I believe, is to be found in the fact that operation for forty years has been so superior to other methods of treatment, while this particular method has rested in the hands of quacks and char-

latans who knew very little of the anatomy, pathology and diagnosis of hernia.

I doubt if this method is applicable to femoral and direct hernias. We have not had a long enough experience (now twenty months) to be able to give you accurate statistics of the number of patients cured (those who have not worn a truss for a year).

In my opinion, the use of this method in the treatment of indirect hernias is safe and will be followed by a successful result in a large number of cases.

AMPUTATIONS FOR DIABETIC GANGRENE

Dr. M. H. Manson, Minneapolis (by invitation): As a result of present day treatment, arteriosclerosis has largely replaced coma as the cause of death in diabetics, and the greater number of deaths among these patients above the age of sixty is explainable by the increase in their longevity. Arteriosclerosis may precipitate a lethal outcome in many ways other than by gangrene, but in event of this complication the surgeon is called upon to exercise his very best judgment and ability.

Gangrene complicating diabetes occurs in about 6 to 7 per cent of cases. This incidence is obtained from the average incidence in 12,037 cases collected from scattered localities, and varies from a low of 3.2 per cent to a high of 18 per cent (Kramer). McKittrick and Root mention gangrene as a contributory factor in 24.2 per cent of diabetic deaths; Morrison, 23 per cent; Rabinowitch, 39.1 per cent; Dublin, 23 per cent (3,386 cases); Kramer, 26 per cent.

We do not wish to enter into the controversy as to whether or not diabetic gangrene is a different pathological process than arteriosclerotic gangrene, but we do subscribe to the attitude that clinically it carries a higher mortality and must be treated with more respect. That this opinion is quite general is attested to by the dictum that amputations in a diabetic should usually be done a joint higher than in a non-diabetic, or that all lower extremity amputations should be thigh amputations. This was undoubtedly arrived at as a result of many sad experiences with post-operative infections and sepsis.

In general in contemplating an amputation, we agree with Kirk, who says, "On the functional value of the stump alone, when properly fitted with a prosthesis, must be based the selection of the site of amputation and the technic of the operative procedure." However, in diabetics, amputation will probably always be a surgical problem for it does not always seem possible to reconcile future usefulness with primary healing and safety.

The procedure to be described is an attempt to fulfill these three considerations more frequently than we have in the past. The technic is not new, being a flapless guillotine amputation described by M. F. Kelly in the *British Journal of Surgery*, April, 1916, and was described before by Kocher and others. In 1930, Urban Maes of New Orleans reported having done approximately sixty cases by this method with only three deaths, these occurring prior to the time of the use of insulin. Two secondary amputations were necessary, one in which drainage was used and one on a patient who had refused amputation for a week after it was advised. There is probably no other such favorable report of leg amputations in diabetics in the literature.

The operative technic is simple, consisting of a circular incision through skin and subcutaneous tissue at the site of election in the leg, *i.e.*, between five and seven inches from the insertion of the hamstring muscles. The skin will retract by virtue of its own elasticity for a distance of a half to one inch. This is aided by pulling from above, but avoiding any undercutting of the skin. The muscles are then cut in a similar manner beginning the incision at the site of the retracted skin. They, in turn, will retract up under the skin for a distance of at least an inch. The tibia is then amputated at the point to which the muscles have retracted. The only dissection that is necessary is to amputate the fibula about an inch shorter than the tibia.

We believe that extraordinary care should be taken to secure perfect hemostasis, care being taken to clamp as little tissue as possible in securing blood vessels. The stump is closed without drainage. It is rather important to avoid the use of a tourniquet, avoid the use of all sharp-toothed retractors, and minimize dissection and retraction as much as possible. The treatment of the bone end and the nerves may be mentioned. It is advisable to bevel the anterior bone edge with the saw and to remove a short cuff of periosteum. Any further procedures such as rasping the edges, etc., are avoided, for, although they may be of value, we believe that the extra time and further retraction that is necessary offsets the benefit. Since Huber and Lewis advocated the injection of alcohol into the nerve ends, this procedure has been generally adopted and is probably the best prophylactic against the formation of neuroma. It is the opinion of those who have had a large experience with amputation of stumps (Kirk) that there is no ideal method of treating the nerve ends; that a neuroma *per se* may give no symptoms unless adherent to scar tissue or so located that it is subject to trauma. For these reasons, if the nerve end has not retracted, it is injected with alcohol. If further dissection is necessary to expose the nerve ends we feel that the trauma to the tissue more than offsets the advantages of injecting the nerves. In the closure only a few sutures are taken through the fascia of the muscles, bringing this over the bone end. The skin is usually closed with metal clips and a firm snug dressing applied.

There have been eight circular amputations done below the knee since the latter part of 1929. Four of these amputations were in diabetics. There has been no hospital mortality. Two cases, one diabetic and one non-diabetic, developed gas bacillus infections in the stumps. In an elderly man of seventy-seven years, in whose stump gas infection was apparent the third day, the stump was opened widely, he was given antitoxin and left the hospital two months later. His general condition was so poor that nothing further was deemed advisable. The other case, a diabetic female of fifty-nine years, was re-amputated on the fifth day. She is in the hospital at the present time and doing nicely.

This procedure, it is apparent, can not be used in every case. All of the available tests and aids in determining the efficiency of the circulation should be used, such as McClure's intradermal saline, the angle of circulatory efficiency, and Moszkowicz' test (except in cases with marked arteriosclerosis and cases with considerable infection). None of these aids, however, determine the amputation site, but are used as additional evidence in forming a judgment as to the arbitrary site chosen. There will occasionally arise the question as to the necessity for planning future usefulness of an extremity stump in a diabetic case, particularly in the most elderly, for Joslin states that two years is the average life span after amputation for diabetic gangrene. However, we have all seen patients who have been up and about for longer periods of time, and should always proceed with the most optimistic view.

OPERATIVE CYSTOSCOPY

Dr. C. D. Creevy, Minneapolis (by invitation): It is a far cry from the first crude instruments of Nitze, made some sixty years ago, to the excellent operative cystoscopes now available; the possibilities inherent in them are still insufficiently appreciated by the portion of the medical profession not particularly interested in urology. It is my purpose merely to call attention to the operations which can be performed with cystoscopes of various types. Many will be inclined to wonder why one should use such expensive instruments for such tedious procedures when the same object can be at-

tained so much more quickly and cheaply (for the surgeon) by open operation. The first argument for the cystoscopic procedure is that its risk is usually less than that of the corresponding open operation; the second, that the avoidance of an incision into the bladder so shortens a given procedure as to give the cystoscopic method an unquestionable advantage.

There is available today such an array of operative cystoscopes as to cause some little confusion. My own preference is for the excellent instrument of McCarthy because of its adaptability. Other instruments, particularly the Brown-Buerger and the lensless instrument of Braasch, are indispensable at times.

Everyone is now familiar with the fact that it is now possible to relieve nearly all obstructing lesions of the vesical neck by some transurethral method, whether that of Bumpus and Bräasch, that of McCarthy, or that of Foley. For inflammatory contractures the transurethral method is incomparably superior to open operation. For prostatic hypertrophy the immediate results with all but the very largest glands equal those of operation with definitely less risk. The question of whether recurrence will take place and in what proportion of cases, remains to be settled. In prostatic carcinoma it is useful both in securing tissue for examination in doubtful cases, and for the relief of obstruction, particularly if supplemented by adequate irradiation with radon and with x-rays.

These instruments are also useful in the excision of the occasional papillary tumors which arise in the posterior urethra and project into the bladder. Any good urethroscope may serve to fulgurate the polyps and granulomata of the urethra which sometimes accompany longstanding urethritis.

In the bladder, operative cystoscopes are no less useful. With their aid one can make biopsies of tumors, an indispensable aid in the selection of the proper form of therapy. Suitable tumors (chiefly the papillary variety) can be fulgurated, excised piecemeal with forceps, cut off with snares, or destroyed with chemicals, in particular trichloracetic acid. My own preference is for coagulation of the surface of the tumor, then removal of the coagulated portion with forceps, then repetition until only a coagulated spot on the mucosa remains. If the excised fragment of tumor shows any signs of malignancy, the base should be embedded with radon seeds and x-ray therapy given.

Flat, infiltrating, highly malignant lesions should not be treated cystoscopically because their extent cannot be determined accurately except by palpation.

Foreign bodies and stones in the bladder also come within the province of the cystoscopist. Many of the former can be completely enclosed by foreign body forceps such as the Young rongeur, while others may be seized and extracted with specimen forceps. If the prostate is not too large and vascular or the bladder too contracted, very large stones may be broken up and removed, the softer ones with the cystoscopic lithotrite, the harder with blind instruments of the Bigelow type.

Occasionally small diverticula are so situated that their removal necessitates transplantation of a ureter, or are so small that their excision seems scarcely justified, yet they may cause persistent infection or stone formation. If the bladder wall is of normal thickness, the margin of the diverticulum may be divided with the Collings knife, allowing the diverticulum to flatten out and thus dispose of stagnation of urine. An indwelling catheter is used and the patient observed closely for forty-eight hours after operation.

Not infrequently a localized area of interstitial cystitis (Hunner ulcer) or of encrustation may be benefited or even cured by light fulguration through the cystoscope.

The operative cystoscope is of great value also in dealing with lesions in the ureter. Stones in the lower ureter most frequently demand manipulation, which may take the form of ureteral dilatation, the injection of lubricants, local anesthetics or antispasmodics through the ureteral catheter, or of extraction of the stones by means of special instruments or by entangling them in multiple, twisted ureteral catheters.

Meatotomy by a special ureteral electrode energized by surgical diathermy is useful if a stone is impacted in or above the ureteral meatus; it is of great value also in stricture of the meatus or ureterocele, in which case cure usually follows slitting of the meatus.

Occasionally pyuria and vesical irritation may persist following nephrectomy, especially when a dilated, infected ureteral stump has been left behind. If there is a stricture of the ureteral orifice, drainage may be improved by slitting it with the meatome. When no obstruction exists, it is often possible to obliterate the ureteral lumen by the injection into it of trichloracetic acid, taking suitable steps to protect the bladder mucosa.

To summarize, the judicious use of the various forms of operative cystoscopes does much to diminish the mortality of urological operations, and to shorten the convalescence and hospitalization of the patient, a factor which is of especially great importance at the present time.

THE CLINICAL ASPECTS OF BENIGN TUMORS OF THE STOMACH

Dr. O. Samuel Randall, and Dr. Clayton Beecham, Minneapolis (by invitation): An analysis of twenty-three cases of benign polypi of the stomach was made. The average age of this group was forty-nine. Males outnumbered the females three to one.

In analyzing the symptoms we found that pain in the epigastrium was the principal complaint and was the usual reason for admission to the hospital. This pain was generally described as burning or gnawing in character with occasional crampy sensations. Vomiting, fullness and eructation of gas were other symptoms. Pain was referred in four patients either to the left shoulder or abdomen. Food aggravated the pain in one-third of the cases, while in a like percentage of patients nausea was found with very infrequent vomiting.

It was interesting to note that there was no loss of weight except where some complication occurred such as luetic aortitis, leukemia and hyperthyroidism. Achlorhydria was the most predominant laboratory finding. All but three patients had no free HCl on gastric expression following histamine (5 mg.). Tests for occult blood were positive in seven cases. Blood tinged vomitus occurred but four times. One patient had a positive Wassermann reaction.

The only outstanding physical finding was that of tenderness to palpation in the epigastrium. Seven of our patients presented no physical findings, however.

The x-ray diagnosis of benign polypi was made in all the cases except one in which polypi were found at autopsy. In this instance the patient died of carcinoma of the colon.

We would like to report very briefly two cases which demonstrate the essential features of this paper.

Case 1.—W. B. W., a male, aged seventy-five, was seen in the out-patient department of the University Hospital in May, 1929. X-ray examination revealed multiple polypi of the middle third of the stomach. This patient refused operation, returned, however, to the hospital eight months later with far advanced carcinoma of the stomach with supraclavicular nodes and metastases to the liver.

We feel that an x-ray diagnosis of benign polypi is not warranted except by biopsy, as this patient most likely had malignant areas when first examined.

Case 2.—A man, aged forty-seven, came to the out-patient department of the University Hospital in December, 1928. At this time two benign polypi of the stomach were diagnosed by x-ray. At gastrostomy per-

formed by Dr. Strachauer, the polypi were excised and their bases cauterized. Four years later this same patient came back to this hospital with a far advanced carcinoma of the stomach.

SUMMARY

1. In this review we found that the most common complaint was pain in the epigastrium.
2. The predominant physical finding was tenderness in the epigastrium.
3. The most important feature and that which we are sure had some relationship to the development of malignancy was the high percentage of cases with achlorhydria.
4. X-ray by Dr. Rigler's department sent back in all cases a positive report of benign polypi of the stomach.
5. Two of our patients developed carcinoma of the stomach.
6. By x-ray alone we are not warranted in labelling a polypus of the stomach as benign, because these tumors have a higher rate of malignant degeneration (12-20 per cent) than other so-called benign tumors.
7. One patient diagnosed benign polypus quite likely had areas of malignancy at the time of diagnosis, as eight months later he presented a picture of far advanced carcinoma.
8. A biopsy should be performed on benign polypi of the stomach as well as on other tumors. Excision and cauterization of benign tumors of the stomach and resection of the stomach in the presence of malignancy should be carried out.

THE PREVENTION OF EXCORIATION OF THE SKIN IN INTESTINAL FISTULA WITH THE USE OF YEAST AS A DRESSING

DR. CHARLES H. MEAD, Minneapolis (by invitation): Fortunately the occurrence of gastro-intestinal fistulæ is rather infrequent in the experience of the ordinary physician. When the condition is encountered, however, it becomes exceedingly distressing both to the patient and the attending physician or surgeon.

Such fistulæ may drain from any portion of the gastro-intestinal tract. They may arise spontaneously following trauma or surgical procedures, or they may be purposely created. Material draining from intestinal fistulæ over the surface of the skin may cause considerable irritation, and may even lead to necrosis, gangrene or sloughing. Fistulous material from the large bowel is usually much less irritating than that from the small gut. Intestinal contents from the small bowel are usually extremely digestive and irritating in quality, especially drainage from openings below the level of the ampulla of Vater in which the trypsin content is high. Material draining from the stomach is also highly irritating, its action probably being due to its acid content.

It is not the purpose of this presentation to discuss the etiology or technical surgical treatment of intestinal fistulæ in general, but simply to present a method of treatment of these patients which should add to the armamentarium of the practicing physician and surgeon. Palmer has stated that "The digestion of the skin of the abdomen and back is so rapid and unrelenting as to make the life of the patient a hardship to himself because of discomfort and pain, and to the nursing force because of frequency of needed dressings." The treatment herein recommended is aimed directly at this problem.

Early surgical closure of such fistulæ is usually out of the question. Medication to inhibit the secretion of digestive ferments has accomplished nothing. Attempts to neutralize the digestive action of the intestinal contents have also been futile. Ointments and various solutions have been applied to protect the skin. It is common, however, for a vicious circle to develop wherein the fistula cannot be immediately closed; the intestinal contents digest the skin and underlying tissue, and consequent surgical closure of the fistula is soon impossible because of unhealthy surrounding structures.

It is quite obvious that if the skin and subcutaneous tissues about the fistula could be protected from the digestive action of the intestinal contents that ultimate clean surgical closure would be greatly facilitated. Many methods have been introduced to accomplish this, a few of which have been partially successful. Cheever and Palmer directed a continuous stream of alkali water into the fistula over a period of days with fair results. The method, however, was laborious and sloppy and usually had to be discontinued because of extensive irritation of the surrounding skin from overflow upon it. Cameron, former Assistant Professor of Surgery at this school, became interested in the problem and developed a method of continuous drainage of a fistula by using an electric pump and suction apparatus. The method of Cameron is very satisfactory and is especially applicable in institutional work. It is believed, however, that a more simple and more easily managed type of treatment may be used.

This therapy was first introduced as a purely empiric type of treatment at the Minneapolis General Hospital in the winter of 1931. A case was encountered upon the Child Surgery Service which was under the immediate supervision of Dr. E. A. Regnier, in which an intestinal fistula developed after appendectomy. There was associated irritation, reddening, erosion, necrosis and sloughing of the surrounding skin and underlying tissues due to the action of the contents of the digestive tract. Attempts were made to limit the food intake and secondarily the intestinal content, but this could not be persisted in without impairment of nutrition. The skin about the fistula was covered with zinc oxide ointment, vaseline, a paste made from fullers' earth or kaolin, multiple coats of rubber cement, paraffin, bovinine, mutton tallow and ordinary glue, all without results. Finally on a purely empiric basis, and by chance, a batter of yeast was made and applied with immediate favorable results. It is believed that this case represents the first application of yeast as a dressing for this type of case.

This treatment has since been used at the Minneapolis General and Minnesota General Hospitals quite extensively and with uniformly good results. Whenever the drainage is profuse in amount suction with Sprengel water pump is of course employed in addition. In all probability enough testimonials are available to make the treatment suggest á Fleischmann Yeast project. For this reason mention of the fact that the Fleischmann moist yeast cake is the only one which produces an adequate batter is made with considerable hesitancy. The treatment proper consists simply of making a thick, putty-like batter with yeast cakes and some water, applying it in approximately a one-fourth inch thick layer to the skin surrounding the fistula, and reapplying three to four times daily.

The exact action of the yeast upon the digestive ferments is not clear. Jobling and Peterson have shown that Gram-positive cocci are strongly resistant to trypsin while Gram-negative cocci are quickly digested. Yeasts (Saccharomyces cerevisiæ) are strongly Gram-positive and for this reason may be little affected by the digestive ferments. No other information has been obtained from the literature which might suggest a specific resistance of these organisms to digestive ferments. Chemical analysis of yeast cakes gives no additional information relative to this problem. In the writer's opinion the protective action is simply due to the adhesive quality of the material. Test tube experiments were carried out in an attempt to determine whether or not the yeast might exert an anti-ferment action. Thus, small cubes of egg albumen 2 mm. in dimensions were inclosed separately in yeast batter, vaseline, zinc oxide ointment, kaolin, fuller's earth, mutton tallow, three coats of rubber cement, paraffin and bovinine, and placed in test tubes. Five such series of specimens were

assembled, with a control cube of egg albumen which was unprotected by any coating. One control egg albumen and a series of protected albumen cubes were then covered with gastric juice obtained from a patient by gastric expression. Three other series were covered with material from duodenal, jejunal and lower ileal fistulæ respectively. The last series was covered with pancreatin which had been activated with fresh bile obtained from a patient with a tube in the common bile duct. In each instance the unprotected cube of egg albumen was completely digested within twelve hours. The best protective agents proved to be vaseline, fullers' earth, kaolin, three coats of rubber cement and paraffin. The cubes covered with yeast, bovinine, zinc oxide ointment and mutton tallow were partially digested. Experimentation with the Mett tube also indicated that the yeast had no inherent protective action, as the albumen was digested in each instance in the presence of yeast. Thus the test tube experiment failed to confirm clinical observations, but substantiated the impression that the protective action of the yeast depends largely upon its adhesive qualities.

Yeast has long been recognized as a definite therapeutic agent. The earliest record of its use dates to 1550 B. C. It is recommended in Eber's Papyrus, an Egyptian medical treatise, as a prescription ingredient for constipation. It has also been demonstrated to have definite value in the treatment of boils, acne, rickets, dental caries, pellagra, malnutrition, arthritis and rheumatoid conditions. It has also been used as a local application in douche form for leukorrhea. The writer, however, has failed to find any record of its use as a protective covering for the skin in intestinal fistulæ. Possibilities for its use in allied conditions are evident. Further investigation of the exact mechanism of its action is indicated.

DISCUSSION

Dr. E. A. Regnier: I wish to confirm Dr. Mead's high recommendation of the use of yeast, although he did not let me in on any remuneration he got from the Fleischmann Yeast Company.

I have in mind two cases where Dr. Mead used this yeast dressing. One case was that of a little girl with general peritonitis followed by a fistula of the small intestine and severe erosion of the skin.

A second case was that of a boy eleven years old who sustained severe abdominal trauma with hemorrhage. He subsequently developed obstruction which could not be relieved by nasal catheter. On exploration every loop of bowel was matted together and an enterostomy was done. This closed very slowly and the secretion eroded the abdominal wall.

I feel that Dr. Mead's yeast dressing was a life saving mechanism in both of these cases and I assure you it worked perfectly and made the patients comfortable.

SOME UNUSUAL SURGICAL CONDITIONS OF THE DUODENUM

Dr. Owen H. Wangensteen: Save for the occurrence of ulcer and its complications, lesions of the duodenum are rare. Congenital atresia of the gut, also a very unusual surgical condition, is more frequently observed in the duodenum than in any other similar length of the intestine. The intestine develops as a solid tube and acquires its lumen by a process of vacuolization of the original solid cord. Failure of vacuolar confluence gives rise to stenosis or atresia. One such case has come under my observation. A gastroenterostomy was done but the infant died. Only an entero-anastomotic type of operation will cure the condition. In all instances in which enterostomy has been done a lethal outcome has ensued. Though the condition is commonly described as irremediable, about ten instances of congenital atresia of the small intestine have been saved by operation.

Another obstruction occasionally observed in this section of the gut is the so-called arteriomesenteric ileus, in which the drag of the superior mesenteric artery and the gut which it supplies, leads to compression of the transverse portion of the duodenum near the spine. Not all dilated duodenums by any means are instances of this character. This pull of the mesentery of the small intestine and right half of the large bowel may occasionally play an important role in the so-called post-operative acute dilatation of the stomach. Arteriomesenteric ileus only becomes operative in the supine and erect postures. When the patient is turned upon his face, the gut and its mesentery falls forward and compression of the duodenum ceases. I have once done duodenojejunostomy (first performed by Staveley in 1911), for a patient with a dilated duodenum who had considerable vomiting of long standing. He has been completely relieved through this procedure.

Obstruction is occasionally observed in the duodenum as a result of intussusception of a gastric or duodenal neoplasm (usually benign). Two successful reductions of such invaginations with excision of the offending tumor have been recorded. Such tumors are also occasionally responsible for occult intestinal hemorrhages. A few instances are also on record in which an annular pancreas has obstructed the duodenum.

Failure of rotation of the embryonic mid loop of the gut may result in the entire small intestine lying to the right of the colon. Recurrent attacks of intestinal obstruction of the torsion type in which the unusually mobile duodenum may participate frequently ensue. When the retroperitoneal ascent of the duodenum is complete, normally small anatomic pockets of peritoneum develop in relation with the superior mesenteric artery and its inferior mesenteric vein. Imprisonment of loops of the jejuno-ileum beneath these folds of peritoneum are described as paraduodenal hernias. Intestinal obstruction occasionally occurs as a complication.

Diverticula are not such infrequent occurrences in the duodenum. There is no general agreement as to whether they are of congenital or acquired origin. They are usually observed along the mesenteric border of the duodenum. The description of outgrowths of intestinal epithelium through the muscular coat of the gut along the blood vessels by Lewis and Thyng gives support to the idea that they are congenital in origin. Their infrequent observation in children and the presence of only two intestinal layers, viz., the mucosa and the serosa in the walls of these sacs, strongly support the view that they are of acquired origin.

On the whole it may be said that diverticula of the duodenum rarely give rise to symptoms. Before their recognition by roentgen examination became frequent, their presence was rarely detected during life. Perforations or inflammation in such sacs are decidedly uncommon. They are occasionally observed in connection with gastric or duodenal ulcer and in biliary and pancreatic disease. It is probable that in most instances they aggravate rather than cause alimentary disturbances.

Four patients with duodenal diverticula have come under my observation in whom operation has been performed. In one, a man of fifty-three years (University Hospital No. 41621), a congenital diverticulum possessing all the gut layers on the anti-mesenteric border of the first portion of the duodenum was excised. He subsequently developed a gastric ulcer. In the instance of a neurotic woman of fifty years (University Hospital No. 49524), complaining of pain in the upper abdomen, in whom no other pathological lesion could be demonstrated, I did a transduodenal diverticulectomy (first described by McLean of Winnipeg in 1923), for a diverticulum buried in the substance of the pancreas. There was no striking improvement and in the four years that have elapsed since this was done the diverticulum has either recurred, or another has developed near its site. Another patient, aged forty-two (University

Hospital No. 62320), who had had three previous operations upon his stomach for recurrent vomiting has been entirely relieved by the excision of a large diverticulum from the first portion of the duodenum. A duodenal ulcer was also excised and a partial gastric resection done, followed by a Polya type of anastomosis. A fourth patient, aged sixty-three (University Hospital No. 53159), has a few diverticula of the duodenum that have not been disturbed. I did a gastroenterostomy for him for an obstructive duodenal ulcer in 1926. Three years later he returned because of vomiting. Excision of a segment of small intestine just beyond the stomach containing many jejunal diverticula on the mesenteric border was done. A month later the patient returned again because of vomiting. The efferent loop of the gastroenterostomy had herniated through the stoma into the stomach. It reduced itself spontaneously a few days later. The patient has remained well.

Duodenal fistula is a serious post-operative complication when it occurs. It is most commonly observed after Billroth II types of operations upon the stomach and is usually the consequence of insecure closure of the duodenal stump. When it occurs early in the convalescence, death from peritonitis is almost invariable. Later the problem is one of replacement of the fluids lost through the external fistulous tract and dealing with excoriation of the skin. When the loss of fluid is great, suction furnishes an excellent medium for its collection. Collected fluid may be readministered through a nasal catheter or through an enterostomy tube. The employment of yeast upon the skin serves as an excellent protective agent. When the fluid loss is great, saline must be given in adequate amounts parenterally to insure a good urinary output and avert the well known blood chemical alterations which otherwise would obtain. Duodenal fistulas after gastric resection occurring late in convalescence can be satisfactorily treated by this means.

When the retroperitoneal duodenum is injured as a result of external trauma or in excision of the right kidney in which care is not taken to see that the duodenum is out of the way before the vascular pedicle is clamped, fistula may occur. There being no deviation of the intestinal current, a much more serious state of affairs prevails than when duodenal fistula occurs after gastric resection. One such patient, Mr. H. G., aged forty-eight (University Hospital No. 53272), has come under my observation. A right nephrectomy had been done elsewhere some months previously. The fistula did not develop at once but only after the lapse of a few months. When he was admitted to the University Hospital in 1926, there was a large raw, excoriated area about the size of a large dinner plate in the right loin. Food eaten soon appeared in a relatively undigested state upon the skin. The patient was in extreme agony and had become a morphine addict. The performance of pyloric exclusion materially improved matters, but there was still considerable drainage through the fistulous opening. A direct attack was then made upon the fistulous opening in the duodenum, but its inner borders were so indurated that inversion was impossible. The external fistulous tract was curetted, but without improvement. Three years ago, I mobilized a pedicle flap of muscle from the latissimus dorsi and swung it into the fistulous tract. The wound was slow to heal but the patient has now remained entirely free from this disturbing annoyance for more than two years.

Internal duodenal fistulas are usually the result of spontaneous anastomosis between the gallbladder and the duodenum as the result of a perforation of a large gallstone into the duodenum. Bowel obstruction may follow as a result of impaction of the stone in the lower ileus. These spontaneous fistulas usually have to be undone because such a diseased gallbladder is prone to give rise to cholangitis.

DISCUSSION

DR. A. T. MANN: I have been very much interested in this series of cases which Dr. Wangensteen presented in such a delightful way. There is one experience which I went through which I think might be of interest to you; that is, the obstruction at the duodenum from the arterio-mesenteric pull across the duodenum in connection with postoperative dilatation of the stomach. This constriction by a tightly drawn mesentery across the third portion of the duodenum is the common cause of post-operative dilatation of the stomach.

The first time that I felt sure that at least some of them were due to this was after an operation for a comparatively simple appendix. My patient improved very nicely for the first twenty-four hours and then began to vomit. The area of distention of the stomach increased until it absolutely filled the entire abdomen. The vomitus became the characteristic color of olive green, showing an obstruction below the opening of the common bile duct into the duodenum. We raised the foot of the bed, trying to get the pressure of the pull of that mesentery off the duodenum and did not succeed.

I thought there was no use waiting very long, so after six hours of that and no relief, with symptoms increasing, I thought we might as well "take the bull by the horns," so I took the patient up to the operating room.

This is the interesting situation which we found. The stomach did fill the whole abdomen and the small intestines were entirely in the pelvis. There was not any more than just a string of intestines to the pelvis and the rest were in the pelvis, empty of contents and packed in a hard mass. I could feel the strong pull of the artery and the mesentery over the duodenum. When I came to get those intestines out it took strong digging to get the first loops out. They were not adherent, they were all loose from each other but were tightly impacted in the pelvis. We delivered the intestines out of the pelvis with great difficulty because they were so tightly packed. We sewed up the incision and there was no more trouble.

I feel that very many cases of dilatation are due to that arterio-mesenteric pull which can be relieved sometimes by elevation of the foot of the bed. When not relieved by that the patient should be operated upon and relieved directly.

F. A. OLSON, M.D., *Secretary.*

IRRADIATED SURGICAL ANTISEPTIC

The discovery in medicine of any new technic or process leads promptly to extended research with similar measures. Last year, Eising reported encouraging results by treating purulent wounds with irradiated petrolatum. This report led Ross to test the effects in vitro of such irradiated surgical dressing. Briefly, Ross found that a 2:1 mixture of petrolatum and hydrous wool fat, after ultra-violet irradiation for four hours, had acquired a sufficient bacterial power to kill Staphylococcus aureus and Bacillus pyocyaneus within twenty-four hours. Ross is inclined to attribute the new antiseptic properties to "secondary ultra-violet emanations" held by the petrolatum-hydrous wool fat mixture, a conclusion previously drawn by Eising. There is nothing in Ross's data to suggest a clinical superiority of this unknown "emanation" antiseptic over ordinary commercial antiseptics added to nonirradiated mixtures of petrolatum and hydrous wool fat. Far more extended and controlled researches are necessary before such results are permitted to breed new proprietary remedies. (Jour. A. M. A., October 15, 1932, p. 1356.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of April 12, 1933

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, April 12, 1933. Dinner was served at 7 o'clock and the meeting was called to order at 8 p. m. by the president, Dr. C. D. Freeman. There were fifty-four members and one guest present.

The Secretary read the minutes of the March meeting, and these were approved as read.

On ballot, Dr. Arthur E. Smith, of Minneapolis, was elected to Active membership in the Academy.

The Scientific Program was as follows:

Dr. F. R. Wright (Minneapolis) reported the following case of "Trichomonas Vaginalis in the Male Urethra."

TRICHOMONAS VAGINALIS IN THE MALE URETHRA

This patient, a forty-seven year old man, was sent to me from Atwater, Minnesota, with a request for help regarding a urethral infection. The patient stated that within twenty-four hours after intercourse with his wife (he denies any transgressions of the moral law) he noticed a tickling sensation in his urethra and a discharge of what he said was pus. Examination of the patient showed the external meatus smeary and plugged with a drop of mucoid secretion. There was no redness about the meatus. Under the microscope this secretion, stained with methylene blue, contained a large number of epithelial cells and comparatively few pus cells. No gonococci were to be found. Urine was voided in two glasses; the first carried some shreds and was slightly hazy, the second was perfectly clear. He had been given a 5 per cent argyrol solution by his family physician, which he had been using three or four times a day. The haziness in the first urine was no more than could be accounted for by the overenthusiastic use of the argyrol solution.

In talking with this patient, he told me that his wife had had a leukorrhea for years. On questioning her she stated that they have been married twelve years and that she had this leukorrhea before her marriage; that she had been to so many doctors and received so little benefit that she had given up hope of ever being any better. At present she says she has a marked vaginal discharge with a continuous uneasy sensation about her pelvis but that she has grown accustomed to this and pays no attention to it. She refused to submit to an examination.

I asked this man to return in three or four days without using any treatment in the meantime in order that he might get rid of any chemical irritation which might be present. At the same time I asked his wife to take a douche daily using two teaspoonfuls of ordinary baking soda to the pint of the solution. He returned to the office after four days and his first remark was that his wife sent word that the douche had given her more relief than all the treatment she had taken. At this time his meatus was filled with a big drop of mucoid secretion which was carefully collected and sent to the laboratory. The urine was perfectly clear, but contained shreds. Laboratory report showed the presence of trichomonas vaginalis.

The interesting and remarkable thing is the fact that although this couple had been married twelve years and the leukorrhea was present before marriage, this is the first time this man has had any urethral difficulty. Apparently the male urethra is not very susceptible to this infection.

Dr. S. E. Sweitzer (Minneapolis) read a paper entitled "Adequate Treatment of Syphilis." Lantern slides were shown. (To be published separately.)

ADEQUATE TREATMENT OF SYPHILIS

SUMMARY

Treatment was outlined as given at the Minneapolis General Hospital, where 396 new cases were seen last year.

The treatment of syphilis should be active and persistent and should continue for at least three years. The time factor is especially emphasized. The treatment should fit the patient and not the patient fit the treatment. Early and long-continued treatment is the only way to prevent cardiovascular, visceral and central nervous system syphilis. Long rest periods are never to be given.

DISCUSSION

Dr. Paul O'Leary (Rochester) (by invitation): Dr. Sweitzer has covered the field of the treatment of syphilis extensively and it will be possible in the discussion to mention only a few of the many points he made. I believe it is quite essential to re-emphasize the idea that the treatment of early syphilis is still a long-drawn-out procedure. Efforts at the rapid cure of syphilis by the so-called "abortive" measures have been quite unsuccessful in the majority of instances. In a study of a large group of cases of acute syphilis which were treated and observed for several years, it was found that those individuals who had had as a minimum thirty injections of arsphenamine in conjunction with either bismuth or mercury showed the lowest incidence of failures. When the group was studied from the standpoint of the number of injections the patients had received, it was found that the smaller the number of injections of arsphenamine, the greater the incidence of relapse.

In a similar study it was found that the most satisfactory type of treatment, as far as clinical and serologic relapse is concerned, is the so-called continuous system, a treatment program by which the patient is continually under the influence of the arsphenamines and one of the metals for approximately one year. For example, an arsphenamine course of six to eight injections, given at five-day to weekly intervals, is immediately followed by a course of mercury or bismuth of approximately twice as many injections. The second course of arsphenamine is started before the bismuth or mercury is stopped. This continuous type of treatment is carried out until the patient has had a minimum of thirty injections of arsphenamine and approximately sixty of bismuth. The value of bismuth as compared with mercury was also emphasized in this study by the fact that in those patients who received the arsphenamine-bismuth course the relapses, both clinical and serologic, were just one-half those observed in patients who received an arsphenamine-mercury course. It seems definitely established now that bismuth has decided advantages over mercury but that it is inferior to the arsphenamines.

In a discussion of acute syphilis attention must again be called to the fact that neurosyphilis is an accompaniment of acute syphilis, although the neurosyphilis may not manifest itself clinically until many years after the infection has been acquired. In patients with acute syphilis in whom the Wassermann reverts to negative, only to remain negative but a short time before it relapses to positive while the patient is under treatment, the spinal fluid is as a rule positive. In other words, if a spinal fluid examination has not been done in a patient who has a serologic relapse while under treatment for acute syphilis, such an examination should be made and the treatment varied according to the report obtained.

Dr. Sweitzer made one point with which I must disagree, namely, that he had not seen individuals who

had been treated for a period of three years and who had had a relapse. I not infrequently see individuals who have had sixty to seventy or more injections of arsphenamine and a corresponding amount of bismuth or mercury in whom the blood Wassermann and spinal fluid examination are persistently positive. The point to be determined in these cases is whether or not the drugs used are inefficient or whether the individual himself lacks a resistance to the disease. It is my own concept that the latter explanation is the more plausible of the two. This has been called to our attention repeatedly since the advent of malaria therapy. Following the introduction of the arsphenamines, the rôle which the resistance of the individual played in determining the course of the syphilis was lost sight of, but now that we have used the drug for approximately a quarter of a century, the value of the resistance mechanism is again to be considered. It is apparent that some patients with syphilis continue to show evidence of progression in the disease in spite of the intensive administration of the arsenicals and bismuth or mercury. In the same individuals, the use of fever therapy results in a complete serologic reversal in a high percentage of cases. This leads me to the belief that fever therapy is not only the best form of treatment for parenchymatous neurosyphilis of paretic type, but even more important that it is a valuable prophylactic against the development of paresis when the arsphenamines and the metals have failed to control the disease. Since the electric devices for the production of fever have become more popular, the factor of the resistance of the individual patient as the significant item in the course of the disease is constantly before us. Accordingly, it is my suggestion that those patients, in whom the so-called specific remedies have been used intensively but in whom the spinal fluid serology has not reverted to negative, be given fever therapy before the disease has progressed too far. Reports in the literature, particularly from Europe, are re-emphasizing the fact that the measures now in vogue to stimulate the patient's resistance are actually more specific than are the so-called "specific" remedies themselves.

Dr. R. T. LaVake (Minneapolis): There are two gynecologic diagnostic pictures not mentioned here that I would like to bring out in discussion. The first, a massive edema of the vulva without obvious abrasion. I erred in the first case that I saw in my practice. A woman came in complaining of tremendous irritation around the external genitalia due, she said, to an iodine burn brought about by an attempt at abortion by a criminal abortionist. The external genitalia were swollen and gave the appearance of a possible chemical burn. She had a negative Wassermann and no glandular enlargement. I treated her in the hospital and discharged her when the irritation permitted. She later developed a rash and positive Wassermann and treatment was instituted by a syphilologist immediately. I have seen five or six similar lesions since then. In each instance the clinician did not suspect syphilis.

The second picture refers to lesions of the cervix uteri. Do not fail to make darkfield examination of suspicious lesions. I have found several primary lesions in his way. Do not operate, cauterize, or radiate any cervix until you have with reasonable assurance counted out the possibility of syphilis.

Dr. F. R. Wright (Minneapolis): Dr. LaVake has spoken of the condition of the female genitals due to syphilis in which the tissues become thick and edematous, very much like elastic rubber. This is the condition described in German books as edema indurativum. The condition is also occasionally found in the male.

Regarding the treatment of acute syphilis in general this depends entirely on the stage of the syphilis when the patient is first seen. If you can make a positive diagnosis before he has any glandular enlargement in the groin, a certain amount of treatment would be necessary. If he comes with a positive Wassermann and palpable glands in one or both groins, a large amount of treatment would be necessary. If he presents general constitutional syphilis with an eruption on his body, then a still more prolonged treatment would be necessary. In the first case, a positive diagnosis before glandular enlargement and Wassermann, the Germans say that one course of neo-salvarsan is sufficient. They put a course of salvarsan as from five to seven grams given at four-day intervals; therefore, it would be from eight to twelve 0.6 gram doses. If the patient comes with glandular enlargement and with a positive Wassermann he should have two such courses given three months apart. If the patient comes with an eruption all over the body he should be treated at least two years. Wassermann should be made every ninety days on all of these cases until at least a period of three years after infection has elapsed.

In the ordinary course of untreated syphilis, clinical symptoms relapse every three months; therefore, the interval of rest between courses of treatment should not exceed three months.

One can accurately judge the age of clinical symptoms by the character of the symptoms presented. The disease relapses every three months; condylomata lata does not occur until the second relapse, approximately nine months after infection.

In regard to those cases known as Wassermann-fast, Colonel Harrison, who had charge of the venereal work in the British Army during the World War and who is now in London, says that a person who has a Wassermann-fast reaction should be given treatment continuously for two full years.

In giving provocative salvarsan as a test, one should not be satisfied with a single Wassermann. Blood should be taken four days after provocative doses and then at four or five day intervals for at least five or six weeks.

In 1900 I was in Vienna in Neuman's clinic of syphilis and dermatology. Professor Neuman used to teach that there were three types of syphilis (this was in the days before the Wassermann or the discovery of spirochete): (1) one which manifests itself with lesions on the skin; (2) another which manifests itself later in gummata of the bones; (3) and one which develops late lesions of the nervous system.

Dr. C. D. Freeman (St. Paul): I wish to agree with Dr. O'Leary's criticism of Dr. Sweitzer's remark that he had never seen any late manifestations of syphilis in patients who had taken three years of treatment.

I am not going to discuss the ordinary treatment of syphilis because we agree more or less except as to details, and that is, and always will be, a matter of personal opinion.

There is a possibility and even a probability that our treatment plays little rôle in the prevention of some of the late manifestations of syphilis, especially paresis.

To digress a little from the title of the paper, I would like to call attention to an article in the *American Journal of Syphilis* by Dr. Leo Kanner. It is rather interesting and illuminating, because it explains the incidence of paresis from a different viewpoint. He states (as I believe is generally accepted) that syphilis was brought to Europe by the sailors of Columbus from America and that syphilis first made its appearance in Europe about 1494 in Italy and Spain. That the big outbreak came at the time that Karl VIII of France invaded Italy—his army containing many Spanish mercenaries. He shows that general paralysis is not equally distributed among the various nations and that this is not because of racial differences but on account of the time the nation became infected with syphilis. He argues that paresis does not appear to any extent in a nation for about two hundred years after that nation has become infected; that it gradually increases for the next two centuries, and then starts to decline.

In substantiation of these points, among others, he states that the places where syphilis started show the

owest incidence of paresis among the white nations; hat on the African continent, except in countries bordering on the Mediterranean, paresis is almost unknown, while among his brothers—the American negro —it is very prevalent, the American negro having been infected much earlier. In China, paresis is less common than in America, but syphilis is more prevalent.

Among the North American Indians, he says that, after most careful inquiries, at most only eighteen cases are recorded in the last twenty years. They are, as far as we know, the first possessors of this plague, and among them paresis is on the decline, although syphilis is prevalent.

I mention this just for the reason that it may have considerable merit and that our old theories of mental overstrain, alcoholism, etc., so common in the white race where paresis is also more common, may be explained by the theory advanced by Dr. Kanner.

Dr. Kenneth Bulkley (Minneapolis): The educational value of such pictures as shown us tonight by Dr. Sweitzer to characterize lesions of syphilis is great. Many years ago, over a period of some four or five years, I had occasion to see rather large numbers of cases of syphilis with my father, Dr. L. Duncan Bulkley, one of the first dermatologists and syphilologists in this country. In those days the Wassermann reaction had not been developed and I cannot help but feel that, due to lack of laboratory assistance and diagnosis, the powers of clinical observation in the older generation were far better than those of the present generation. Errors in diagnosis of syphilis are made today often because the individual clinician does not trust his own diagnostic ability but depends too much upon laboratory assistance. The point I wish to emphasize is simply that if one clinically is certain that a definite lesion is syphilis, that that case be treated as syphilis irrespective of what the laboratory says in regard to the diagnosis. In other words, I believe that clinical judgment based on experience always has a perfect right to argue with the laboratory on the question of diagnosis.

Dr. H. E. Michelson (Minneapolis): The subject of syphilis is so large and lends itself to discussion so well that one might talk on most any phase of the subject. When an individual is infected with any disease, the first question that we ask is—what is the infection, what type of terrain is it implanted in, and have we any specific treatment?

In syphilis we know that the spirochete is the infector, and, in spite of the many manifestations, experimental syphilis has shown that the spirochete which causes all types is one and the same.

Why do we treat syphilis for such a long time? We must realize that the treatment is directed with the thought that, by keeping the individual under the influence of these drugs for a sufficiently long period of time, we are enabling him to combat successfully the disease. When we keep this in mind, we at once know that we have no index for knowing just how much chemical reinforcement one body needs to successfully overcome syphilis. Therefore, we must keep all bodies under the influence of the drugs for a length of time which experience has shown is sufficient to protect, and maybe cure, a very large percentage of people having syphilis.

In an acute infection for which we have specific treatment, such as diphtheria, we have fairly good guides for the amount of treatment necessary, but in syphilis the nature of the disease makes decision at any one time impossible.

There is no question but that the syphilographer of the pre-Wassermann days was a very astute diagnostician, but after all is said and done, the laboratory is essential for guiding us in the treatment of the disease.

We must also realize that the present-day treatment is a chemical and not a biological treatment and that after we have treated patients for two and a half to three years with chemicals, and we still have evidences of activity, the only thing we have to fall back on is malaria or a similar form of treatment. Hence, we may state that the first two to three years of treatment of early syphilis is chemical, and if decided results are not then obtained, we must turn to malaria therapy.

Dr. F. C. Rodda (Minneapolis): I would like to ask Dr. Sweitzer a question. Given a case of congenital syphilis which has had a thorough treatment with neoarsphenamine, bismuth, and mercury inunction over a period of two years, with a persistent positive Wassermann, what do we have to offer as to prognosis and when should the treatment be terminated?

Dr. Sweitzer (in closing): I will answer Dr. Rodda's question first. The best treatment of congenital syphilis is its prevention. A lot of such patients are hopeless right from the start. We try to treat the mother and prevent congenital syphilis. If you can get them early enough and they are not too overwhelmingly infected when treatment is started, you may get along amazingly well. If we have a patient who comes in and at the end of two years of treatment we find a positive Wassermann, usually that patient has not been started on treatment as an infant. We usually treat those for three years and then if they get along all right and their general health is good we let them go. We have had some of those who have a persistent positive Wassermann after years of treatment. It would be advisable to do a spinal on those before deciding to stop therapy.

In regard to Dr. O'Leary's discussion, I would say that my own experience has been that in cases that have early syphilis you will find a lot of them with positive findings and they will have spirochetes in the blood in the fourth or fifth week, long before the glands are involved. One doesn't know just where to stop. If you take one hundred patients, early cases, and say—give them so much treatment and their syphilis will be cured,—you will find there will be a certain percentage that will not be cured. That is not so good.

To help Dr. Wright out, the condylomata cases I said were a syphilis of from six to nine months, and those early ones were untreated. Dr. Finger, of Vienna, gauged them by their size. Condylomata lata can come fairly early after syphilis. In cleanly patients we do not see them so much.

In regard to Dr. LaVake's remarks, this edema is well known and it is a rather startling thing to see. Ordinarily you can find the sclerosa on the inside of the labia. In regard to the chancre of the cervix, I did not say anything about that for I did not want to embarrass the gynecologists. They sometimes cut them out or treat them with radium and then, after they break out, decide that the patient has a chancre.

As to the question of how long one should treat these patients, I hope some day we will be able to tell just when these patients are cured. Some one mentioned that all cases were not cured at the end of three years. Most of those cases are the type called syphilis maligna precox. That is found in inferior soil, *i.e.,* those individuals who do not have the resistance to throw off the infection. Dr. Freeman has had one case of that, but I did not mention it because it was not my case. When these cases do come in and do not get along so well, I usually interrupt the treatment and give malaria or shock therapy of some kind to develop the resistance of the patient, and then many of them will respond to antisyphilitic treatment. Shock therapy is usually typhoid.

The treatment of syphilis is undertaken by so many men. The eye men see cases of iritis. It should be treated as a systemic disease and treated with the idea that you want to cure the patient. We treat syphilis with the idea of preventing the late sequelæ. The earlier you can get the patient and the more energetic your treatment, the more successful you will be.

Dr. C. C. Chatterton (St. Paul) gave a talk and lantern slide demonstration on "Extra-Articular Fusion of the Hip."

Dr. H. A. H. Bouman (Minneapolis) read a paper entitled "Something about Iodine." (To be published later in Minnesota Medicine.)

R. T. LaVake, M.D.
Secretary.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

Gastric Anacidity. Arthur L. Bloomfield, M.D., Professor of Medicine, Stanford University, and W. Scott Polland, M.D., Instructor in Medicine, Stanford University. 188 pages. Illus. Price, $2.50, cloth. New York: The MacMillan Company, 1933.

Cervico-vaginitis of Gonococcal Origin in Children: Report of a project of the Bellevue-Yorkville Health Demonstration, New York City. Walter M. Brunet, M.D., Dora M. Tolle, M.D., et al. 97 pages. Paper. New York: Milbank Memorial Fund, 1933.

Le Nystagmus Vestibulaire. Docteur R. Claoué (Paris). 64 pages. Paper. Paris: Editions Medicales Norbert Maloine, 1933.

Diseases of Tradesmen. Bernardino Ramazzini (1633-1714). Compiled by Herman Goodman, B.S., M.D., New York. Silk Handlers' Disease of the Skin. Herman Goodman, B.S., M.D. 96 pages. Illus. Cloth. New York: Medical Lay Press, 1933.

Wheat, Egg or Milk Free Diets. Ray M. Balyeat, M.A., M.D., F.A.C.P. Associate Professor of Medicine and Lecturer on Diseases due to Allergy, University of Oklahoma Medical School, etc. 150 pages. Illus. Cloth, $2.50. Philadelphia: J. B. Lippincott Co., 1933.

Dietetics for the Clinician. Milton Arlanden Bridges, B.S., M.D., F.A.C.P. Associate in Medicine at the New York Post-Graduate Medical School, Columbia University. 666 pages. Cloth, $6.50. Philadelphia: Lea & Febiger, 1933.

Abortion. William J. Robinson, M.D. Consultant to the Bronx Hospital, etc. 123 pages. Cloth, $2.00. New York: The Eugenics Publishing Co., Inc., 1933.

ANNUAL REPRINT OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 1932. Cloth. Price, $1.00. Pp. 104. Chicago: American Medical Association.

The Council on Pharmacy and Chemistry still carries on its work of informing the medical profession concerning the new medicinal products brought out by the various manufacturers of pharmaceuticals. This volume contains the reports on products considered and rejected by the Council during the past year. Among the reports of special interest are: Amertan, an unoriginal mixture of tannic acid and merthiolate in a water soluble jelly, marketed under a proprietary, uninforming name; Antiopin, a mixture of indefinite composition offered under a nondescriptive, therapeutically suggestive name and marketed in a way that may foster the drug habit; Eubetin, another insulin substitute for oral administration marketed under a proprietary uninforming name with unwarranted claims; Ferro-Copral, a mixture of saccharinated ferric oxide, manganese citrate and copper proteinate proposed for use in the treatment of pernicious anemia and marketed under a proprietary name with unwarranted therapeutic claims; Hepatex P.A.F., a liver preparation proposed for intravenous use and marketed under a proprietary and insufficiently descriptive name with no satisfactory evidence of the safety of its recommended intravenous use; Bi-So-Dol, an unscientific "alkalinizing" mixture offered under an uninforming proprietary name with exaggerated and unwarranted claims of therapeutic usefulness; Gan-Aiden, consisting mainly of the well known ethyl amino-benzoate (benzocaine), a preparation of undeclared composition marketed under a noninforming, proprietary name; Myodin, Subidin, and Sanguiodin, unscientific preparations of iodine marketed with unwarranted claims and indefinite, incorrect statements of composition, under proprietary uninforming names, and Tonikum-Roche (now Elixir Arsylen Compositum-Roche), a "shot-gun" proprietary "tonic" marketed with misleading therapeutic claims.

Besides the reports on rejected articles, the volume contains "Preliminary" and "Special" reports of exceptional timeliness and value: The preliminary report on Thorotrast, a colloidal thorium dioxide preparation proposed for use in retrograde pyelography and for roentgen visualization of the liver and spleen by intravenous administration, is an excellent example of this class of reports. The articles on Nirvanol and Trienthanolamine are also interesting and effective preliminary reports. Among the "special" reports, those on Sulpharsphenamin and Mercurochrome are outstanding. Each report definitively clears up the present status of the drug concerned, the former, on the basis of a questionnaire circulated among leading syphilologists, and the latter on the basis of independent bacteriologic investigation, done by consultants of the Council.

NEW AND NON-OFFICIAL REMEDIES, 1933, containing descriptions of articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on Jan. 1, 1933. Cloth. Price, Postpaid, $1.50. Pp. 498; lvi. Chicago: American Medical Association.

The annual editions of this volume contain all that the busy physician needs to know concerning the newer preparations which he is daily importuned by the detail men of the pharmaceutical manufacturers to use. The remedies listed and described here have been examined and found acceptable by the Council on Pharmacy and Chemistry, the deliberative body charged by the American Medical Association with the performance of this service for the practitioner, who has not the time or means to make the determinations for himself. Among the new preparations admitted during the past year are: Trichlorethylene-Calco, an inhalation anesthetic proposed especially for use in trigeminal neuralgia; Nostal, an additional barbituric acid compound; Decholin and Decholin Sodium, bile salt preparations for use in functional insufficiency of the liver, the sodium salt being suitable for intravenous use when necessary; Biliposol, Bismo-Cymol, and Iodobismitol, bismuth compounds for use in obtaining the systemic effects of bismuth, especially in syphilis; Triphal, a gold salt proposed for use in the treatment of lupus erythematosus; a number of improved liver preparations for use in the treatment of pernicious anemia; two halibut liver oil preparations of high Vitamin A and Vitamin D content; and Pentnucleotide, the sodium salts of the pentose nucleotides derived from the ribonucleic acid of yeast, proposed for use in infectious conditions accompanied by a leukopenia or neutropenia.

The book contains general articles, descriptive of the classification under which the various drugs are listed. According to the preface, more or less thorough-going revisions have been made of the articles: Arsenic Compounds, Dyes, Iodin Compounds; Liver and Stomach Preparations; Radium and Radium Salts and Silver Preparations.

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PITFALLS IN CARDIAC DIAGNOSIS*

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BEFORE we can understand the symptoms of a disease, it is essential to know the pathological changes produced by the disease and whether these changes are evanescent or permanent. In addition, we must know the etiology and usual clinical course, and further determine how the organ and organism function in the presence of these pathological changes, *i.e.,* the degree of handicap their presence imposes.

Especially during and since the Great War, the field of cardiology has been intensively studied for all of these factors. With a more exact x-ray technic, and a more extensive clinical use of the electrocardiograph, a vast cardiological literature has accumulated. More minute pathological studies of the heart have correlated antemortem findings with post-mortem changes, and these have been further correlated by experimentally producing similar lesions in animals and obtaining graphic records.

For nearly a decade, the field of cardiological thinking has been dominated by instruments of precision and a study of cellular pathology. It was a thrilling experience to see an x-ray silhouette, read a cardiogram, and make a diagnosis and prognosis.

We were not lacking in statistical studies to tell us, from analysis of questionnaire letters, just how long these patients with structural damage as evidenced by their graphic records would live. The art of medicine was being displaced by this science of medicine. No more fumbling, no more guesswork, cardiology was coming into its own.

But there was a joker in the pack. These patients were not always handicapped as the graphic records suggested they should be; and they did not accommodatingly die when statistical studies prophesied they should. An unforeseen factor entered the picture to spoil our theories and make us doubt whether cardiology belonged in the realm of pure science after all. That factor was time, the true developer of understanding and the mellower of wisdom. We found that in spite of all our studies and the revelations that instruments of precision had given us, we were still just as unable to foretell the day of a man's death as were the wondering prophets in the Biblical days of old.

There must then exist a quality of vitality, an inherent residuum of functional capacity, as yet not measurable by scientific methods. True, our grasp of cardiological problems had been immeasurably broadened and deepened by this instrumental approach with its experimental research; and our clinical handling and pharmaceutical attack had been rendered more efficient and direct and more adequately controlled, but the aims of the pioneers, perhaps I should rather say their hope, implied rather than directly expressed, had failed to materialize.

The crippled heart, structurally defective, as instrumental studies repeatedly revealed, continued to function, to carry on, to enable its possessor to do his limited daily work.

Those of us whose interest in heart problems antedates this newly developed science of cardiology, occasionally, with a feeling akin almost to foolhardiness, trusted our clinical estimation of the patient's cardiac capacity and advised necessary operative procedures, and were rewarded with a successful outcome.

Out of such experience has been built up the belief that, at least in the field of cardiology, the art of medical practice still dominates the science, that while the science, so called, tells us of structural damage, and predicates trends, the art,

*Thesis presented before the Minnesota Academy of Medicine, November 9, 1933.

built up from years of experience, must guide us in advising the patient.

Years ago Emerson stated that all increase in knowledge could be expressed by the "Law of the Ascending Spiral." Starting from the initial point and sweeping forward in a wide circle of supposedly newly acquired facts and experience, trying this and abandoning that, we eventually return nearly to the original starting point, with but a slight increment of knowledge, which had raised us an iota above the initial level. Cannot we apply this same law to our excursions in the field of cardiology?

When the swing around the circle started, we began to forget much of the accumulated empirical wisdom of our earlier cardiological forebears, but as we are inevitably returning to our starting point, we now find that we have added but a small increment of wisdom and must still retain much of what they left us as an accumulated heritage.

What does the present inventory disclose? A vast amount of empirical wisdom and a modicum of fresh factual addenda, with the result that, despite our present day more exact knowledge of structural cardiac damage, an estimate of the damaged heart's functional capacity still is the important consideration.

Thus, I come to the crux of my thesis, *the estimation of the functional capacity of the heart.*

The normal heart inevitably functions automatically and without somatic sensations in the normal individual. The diseased heart may or may not function without making its possessor aware of its activity.

Sensory awareness of cardiac activity may arise from several causes. A normal individual with a normal heart in anticipation of an athletic contest may have an automatic acceleration of his heart action to perhaps 120 beats per minute through anticipatory excitement, which acceleration prepares him for the necessary increased muscular activity, the degree of rise in the heart rate, of course, depending on the previous training and also on the sensitivity of the individual's nervous system.

The activity of the affected heart, with a compensated quiescent healed mitral valvulitis, will be more violent in its anticipatory response, but even then its increased activity may not make itself manifest. The frequency with which in draft board applicants we encountered compensated valve defects, of which the possessors were unaware, attests to this. Therefore, the mere finding of a compensated valve defect does not predicate the diagnosis of active heart disease and indicate treatment. Our duty merely lies in estimating the percentage of physical handicap, if any, and advising the patient accordingly.

In order to simplify the detailed discussion to follow, let me divide the field of heart disease into three large groups.

I. Infectious
   - Rheumatic
     - Polyarthritis
     - Tonsilitis
     - Chorea, etc.
   - Subacute bacterial endocarditis
   - Syphilis

II. Toxic
   - Hyperthyroidism
   - Other causes

III. Degenerative
   - Coronary sclerosis, alone
   - Heart disease associated with or secondary to systemic disease, *i.e.*
     - Arteriosclerosis
     - Chronic nephritis
     - Diabetes
     - Emphysema
     - Hypertension
     - Anemia, etc.

There is an additional questionable group in which the heart, not primarily diseased, is played upon by emotional and nervous stimuli, and responds by increased activity irrespective of physical need—the so-called irritable heart.

The infectious type (exclusive of syphilis, the cardiac effects of which appear usually after forty years of age) is chiefly a disease of youth up to the age of thirty-five years, attacking the heart often as a pancarditis, involving endo-, myo- and pericardium, the brunt of the attacks usually falling on the endocardium, and resulting in scarring of valve edges and shortening of the chordæ tendinæ.

The mitral is the usual valve affected and an insufficiency the commonest result. The aortic valve is less frequently affected, usually only after two or more attacks of rheumatic fever, and then associated with a mitral valvulitis, the resulting defect being an aortic insufficiency.

Occasionally, the rheumatic process selects only the aortic valve and the resulting insuffi-

ciency must then be differentiated from that due to syphilis. Patients with rheumatic endocarditis usually survive. The mere finding of a mitral valve defect, fully compensated, as evidenced by a systolic murmur heard over the apex and an accentuated pulmonic second tone, does not, merely by its presence, signify that treatment is necessary.

When the rheumatic valvulitis has gone on to extensive scarring with resulting narrowing of the valve orifice (mitral stenosis) then we have to deal with one of the most crippling of valve lesions and the problem is one of a handicapped individual, who is perpetually a cardiopath.

It is the non-crippling scar on the mitral valve producing a systolic murmur over the apex and base with an accentuated pulmonic second sound that seeems to lead so many practitioners astray. Why is it that we can allow a patient to recover from typhoid fever or from pneumonia, but we cannot allow him to recover from a rheumatic endocarditis? Scars must remain in the intestine following typhoid and in the lungs following pneumonia, but we cannot see them (except as some possible fibrous increase in the lung design as revealed by the x-ray) but since the individual looks well and feels well, and is able to live his usual life, we do not bother about these scars. Where the heart is concerned, our attitude is entirely different.

An individual may have recovered from a previous rheumatic fever, associated during its course with mitral valvulitis of moderate degree, leaving a slight scar on the valve which prevents perfectly tight closure.

Fortunately, the myocardium and pericardium often escape with no demonstrable damage and the muscle of the left ventricle and left auricle hypertrophies to counteract the slight valve defect and the individual is able to carry on his normal life's activities without any handicap, usually unaware that anything is amiss, until, during the course of some general examination, the physician's stethoscope detects a mitral systolic murmur over the apex. At this moment the patient's future activity and peace of mind may hang in the balance. If the examining physician, impressed by the sounds his stethoscope brings to his ears and intent on proving his erudition, tells the patient, "You have a heart murmur from a leaky valve," and if, in addition to finding that murmur, the physician notes an accelerated heart rate (perhaps induced by the excitement attendant upon the examination) and concludes that the condition needs treatment, prescribes rest, or restricted activity and digitalis, then, depending on the impressionability of the individual, the brand "Heart Disease" is burned into this patient's consciousness and the possible cardiopath is converted into the cardio-neuropath and "the last state of that patient is worse than the first."

Medical knowledge of a generation or two ago comes to be household knowledge of today, with this reservation, namely, the average layman's lack of capacity for understanding and applying facts concerning himself. The newspapers and lay magazines now contain a multiplicity of articles on matters of health and the frequently stressed fact that heart disease is on the increase and is now the major cause of death. What happens when a patient is told he has heart disease? He takes it as an ominous portent of eventual sudden death. This belief of the portentousness of heart disease being the heritage of a former medical belief (and now a part of the layman's belief) dates back to an earlier time when physicians lacked the aid of instruments of precision for better differentiating between the various types of heart disease; when we tolerated focal infections and allowed them to continue to work their devastating effects; when we confused the anginal syndrome with coronary infarction. Therefore, when finding a systolic murmur at the apex we say to the patient, "You have heart disease," we may set in train a correlation of the ideas above detailed, and may induce into the individual's consciousness a fear of sudden death, handicap his previously free existence, and cloud his quondam happiness. When, therefore, you detect an old inoffensive mitral scar, as evidenced by the mere hearing of a mitral systolic murmur, beware!

Subacute bacterial endocarditis engrafted on an old mitral valvulitis, usually occurs in youth and tends to lead its victim in a downward progressive course to the grave in spite of treatment. Fortunately this involvement is relatively rare when we consider all the existing rheumatic heart afflictions. Occasionally this process arises on an old scarred valve late in life, and determines the final exitus of the cardiac cripple.

The toxic type of heart disease occurring in youth or middle age is exemplified by hyperthyroidism and should not need much discussion for

those of us who live in the Great Lakes Basin where goiter is so prevalent. A rapid heart, moist skin, obvious nervousness without signs of congestive heart failure and no slowing response to digitalis (which is so frequently tried) should make us suspicious of goiter. It should also be remembered that occasionally auricular fibrillation ushers in the onset of hyperthyroidism.

We must not forget the possible effect on the heart, in middle and later life, of long standing adenomata of the thyroid which may manifest their effects in two ways: (1) by acceleration of the heart rate through their toxic action without signs of congestive heart failure; (2) by mechanical pressure from the enlarged gland, often substernal, which may impinge on the phrenic nerves and produce intermittent or continuous pains in the precordium simulating the anginal syndrome.

The toxic adenomata should be removed, of course, and the substernal thyroids should be removed because of their mechanical embarrassing effects to the circulation. There is a third type of adenomatous thyroid that is seen in the sixth and seventh decades where, in spite of normal metabolisms, there seems to be toxic effects on the heart and circulation, and these also should be removed. No matter what the age of the patient, toxic and mechanically obstructive thyroids should be removed. Surgical removal of such thyroid glands will, provided the toxic damage has not existed too long, bring about rehabilitation of the patient, restore his cardiac efficiency, and cause a disappearance of the precordial pains.

We now come to that middle aged group possibly carrying in their hearts an old scar on the mitral valve from some infection acquired in youth but long since healed. Such individuals may have lived an active useful life unaware of this scar on the valve and unhandicapped by its presence. They are now in the age zone where insidious degenerative changes may be taking place in the heart as well as in the body generally: where increased deposit of abdominal fat may result in dyspnea on exertion; where years of sedentary life may have reduced the general muscular tone, so that moderate unusual exertion may induce palpitation of the heart, where smouldering arthritis in the spine may send radiating pains around the precordium; where the blood pressure level may be raised to a constantly higher plane or may show intermittent periods of slight or sharp elevation with intervals of return to normal; where the individual himself is aware of the number of years he has lived, and so, when his friends begin to drop off around him, becomes increasingly apprehensive with each succeeding birthday.

The nervous system in such individuals for years bombarded by the stress and strain and worry of business may, in the fifth and sixth decades, begin to show signs of the wear and tear of life, as manifested by a lowered threshold to stimuli, and thus the individual becomes increasingly aware of previously unnoticed somatic sensations.

Likewise, the woman in the menopause experiences a slowing down in vitality, acquires an increased deposit of abdominal fat, and is subject to rises in blood pressure with the result that she may be disturbed by symptoms referable to the heart and circulatory system.

Because of all of the above factors, there is no place in the field of cardiology that requires greater skill and judgment in differentiating between functional disturbances and organic changes in the heart nor wisdom in guiding the patient.

We still have to deal with that final questionable class which the pathologists deride and the clinicians abhor, namely, those slender asthenic individuals with sensitive nervous systems, unduly conscious of their hearts. Da Costa first described these individuals during the Civil War, and they were reinvestigated in the Great War, and classified as "Irritable Hearts" or D. A. H. (disordered action of the heart). Since Da Costa's time we have been accustomed to deal with this syndrome in private practice but not in such numbers nor with such severe symptoms as the emotional and mental stress of trench warfare produced.

Quite an extensive study of these types resulted in three conclusions: (1) that generally these hearts were fundamentally sound and that the syndrome usually arose in slightly built individuals of a sensitive nervous system; (2) that rest, digitalis, and a diagnosis of heart disease did not quiet these fast beating hearts, but rather tended to aggravate and prolong the condition; (3) that sedatives and graduated exercise (notably walking) restored over 60 per cent to normalcy; (4) that the finding of a systolic murmur over

the apex need not alter the treatment nor affect the recovery, the murmur probably having existed previously, without cardiac embarrassment. So impressed were the British Commission, who studied this problem, with the unwisdom of referring to these cases as heart disease, that they designated them merely as D. A. H.

And now may I submit a few histories of cases illustrating some of the pitfalls of cardiac diagnosis thus far expressed?

Case 1.—M. W., aged twenty-nine, a saleswoman, came to my office May 24, 1927, with the story that she had been in her usual health up to January, 1927, when she had an attack of erythema nodosum and stiff knees. She was in bed four weeks with a fever ranging between 101 and 102, and profuse sweats, and the attending physician found a valvular insufficiency and prescribed "drops" for the heart. Since February, she had been mildly ambulatory, but never free from sensations referable to the heart. Her complaint at that time was palpitation of the heart on the least exertion, nervousness, occasional periods of diarrhea, but a very good appetite though this had not resulted in any gain in body weight. In addition she noted a sense of general body warmth, even warm hands and feet. She stated that she was slightly short of breath on exertion and had some slight swelling of the ankles.

As to her previous illnesses, she had had scarlet fever at the age of one year, and this had been followed by a tonsillectomy. She had had measles at the age of five, but no other illnesses.

The findings of note on physical examination were: a moderate sized, bright eyed listless individual whose skin was rather pink and flushed, whose hands showed moist warm palms, and a fine tremor of the fingers. The eyes were slightly prominent, the pupils were equal, circular, and reacted to light and accommodation. The tonsils had been cleanly removed, and the thyroid showed a two plus enlargement.

The heart showed no gross enlargement, the borders to percussion being 4.0 cm. right and 12.0 cm. left. A slamming apical first tone with a presystolic murmur was heard over the apex, and a musical note heard over the mid-precordium which increased on inspiration and diminished on expiration. This raised the question of a pericardial friction rub.

The heart rate was 128, and the rhythm regular. The blood pressure was 140 systolic and 70 diastolic. Examination of the abdomen revealed the liver not enlarged, and the spleen not palpable. The extremities showed no edema of the shins, and the knee jerks were present and equal. Her average weight was 105, and her present weight 98 pounds.

The patient entered the hospital June 6, 1927, where the records revealed a basal metabolic rate of plus 28 per cent, hemoglobin 83 per cent, erythrocytes 4,800,000, leukocytes 5,700, P.M.N.'s 56, lymphocytes 41 per cent, eosinophiles 3 per cent.

After a week's rest in bed on Lugol's solution and sedatives, the patient began to run a fever, and the murmur over the apex became louder and harsher, and the metabolic rate rose to plus 46 per cent. The fever continued to run between 100 and 101 F. The leukocyte count did not go above 9,000. This state of affairs persisted for a month, and in spite of absolute bed rest and treatment, the patient seemed to be growing worse. It was of course, obvious that we were dealing with a toxic type of hyperthyroidism, but it seemed probable that we had an associated endocarditis. The fever seemed to be too high to be produced by the hyperthyroidism, so I concluded that it must be coming from a fresh endocarditis. What was I to do? Certainly, the hyperthyroidism was breaking down the patient's resistance, and aggravating the heart condition, and of course this should be checked, but what would a thyroidectomy do to this endocarditis? If the thyroidectomy were not done the patient would surely die, and if the thyroid was removed she might die from the shock and acceleration of her endocarditis. One would be death by omission, and the other death by commission. I chose to take the active course and on June 21, 1927, she submitted to a subtotal thyroidectomy. Following the operation, the patient's pulse rose to 160, but remained regular and her temperature went to 102.5 F., but gradually subsided within a week to normal. During this period, she had a definite psychosis, but at the end of ten days her heart was quiet, the fever gone, the mind clear, and she left the hospital at the end of six weeks with a pulse of 80, normal temperature, and no signs of fresh endocarditis. Three months later, she showed a complete recovery, heart rate of 72, rhythm regular, and the musical note in the fourth interspace had lost its character of a pericardial friction rub, and was more the murmur of a buttonhole mitral stenosis.

In June, 1932, five years after her thyroidectomy, she reported to the office for some minor condition, and stated that she had been well and active during the past five years. Her weight was 115 pounds, hemoglobin 80 per cent, erythrocytes 4,300,000, leukocytes 8,200, blood pressure 110 systolic, 70 diastolic, and on auscultation she showed signs of a pure compensated mitral stenosis.

Case 2.—Mrs. L. M. F., a sixty-six year old housewife, came to my office in April, 1931, stating that, up to eighteen months before, she had been quite well, reasonably strong, and had done her own housework without undue fatigue. About this time, she began to notice pains over the heart, behind the left shoulder blade, and down the left arm. These pains were first noticed while in bed at night, and would last several hours. Three weeks prior to her first visit to the office, she was awakened out of a sound sleep with an awful feeling as though death were approaching. She said, "I felt no pain, but this feeling of horror outweighed all other sensations." The physician who was called at the time, diagnosed the condition as angina pectoris. The patient was kept in bed four days. Since that time, the pains have been more frequent and more severe.

She stated that she had a gallbladder operation for removal of stones in 1918, and had all infected teeth removed fifteen years ago. She had had no dropsy and no dyspnea. Her average weight had been 120; present 111 pounds.

The findings of note in the physical examination

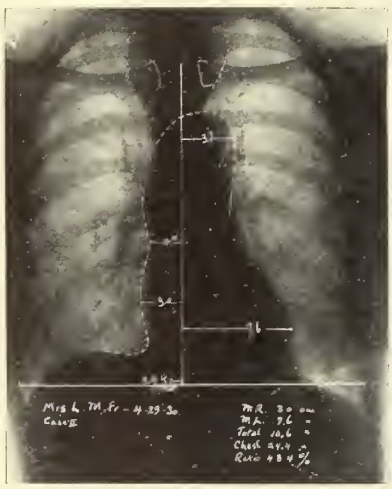


Fig. 1

were a two plus firm adenomatous enlargement of the thyroid which was definitely substernal, and could not be raised out of the sternal notch. She had a normal sized heart with a rate of 96, regular rhythm, clear tones, and no murmurs. Her blood pressure was 150 systolic and 90 diastolic; hemoglobin 65 per cent, erythrocytes 3,860,000, leukocytes 5,650, basal metabolic rate of plus 6 per cent.

X-ray of the chest (Fig. 1) revealed a small centrally placed heart, total transverse diameter of 10.6 c.m. and a substernal shadow continuous with the thyroid which extended down to the arch of the aorta. The electrocardiogram showed a low "T" wave in leads one and two, and a flattened "T" wave in lead three, but no evidence of coronary occlusion. I believed that her pains were due to mechanical pressure from a substernal thyroid, and not due to angina pectoris.

She refused a thyroidectomy, continued to lose weight, to run a heart rate around 90, and to have a mild general trembling of her whole body, a sense of suffocation, definite dyspnea on exertion, and occasional attacks of precordial pain. After three months, when she had lost a total of nineteen pounds, she consented to a thyroidectomy, which was performed on July 24, 1931. The second post-operative day, she developed auricular fibrillation which was readily controlled by quinidine. Beyond this, she made a smooth post-operative recovery, and left the hospital on the eighteenth day.

One year later, her weight had risen to 119 pounds, a gain of 28 pounds. She was leading a normal life with occasional attacks of pain in the precordium, not characteristic of angina pectoris. Her heart rate was 72, and her blood pressure was 160 systolic and 90 diastolic. Apparently, in this case, we had a degree of thyroid toxemia not revealed by the low metabolic rate, and I believe this case illustrates very nicely the dictum that a toxic thyroid should be removed, no matter at what age.

Case 3.—Mrs. E. L. S., a widow, aged forty-seven, presented herself at my office on February 22, 1931, stating that for several months she had been subject to attacks of pain across the chest coming on at night, arousing her from sleep, lasting an hour or more, and passing off spontaneously. In addition she complained of pain in the left shoulder and the inner side of the upper left arm and axilla. These arm pains appeared either during the day or at night, and either while quiet or undergoing exertion. She further stated that she was very nervous and was a fitful, restless sleeper, and finally she stated that she had been told by another physician that these pains were due to angina pectoris and that she had had ambulatory treatment for this condition without relief.

As to her previous history, she was the mother of two children, aged twenty and twenty-three respectively. Her husband had died rather suddenly two years before under conditions that seemed to have a direct bearing on her present problem. She stated that while driving with her husband in his auto, he suddenly experienced an agonizing pain in the left arm, and asked his wife to take the wheel. The pain increased in intensity, gradually radiating onto the left chest. He reached home shortly after the onset of the pain, and the physician, who arrived about the time the patient expired, diagnosed the cause of death as angina pectoris. Naturally, when the widow was told two years later that the pains of which she was complaining were due to angina pectoris, she would recall her husband's death and expect she was approaching a similar fate. This situation was further aggravated because of turmoil in the family in which she was acting as a buffer between her two children and trouble. It was doubly important, therefore, to eliminate this fear, which could only be accomplished by a thorough examination, and the finding of proof for or against the diagnosis of angina pectoris.

She had submitted to a hysterectomy for bleeding fibroids five years previously, and also to an appendectomy at the same time, and had not menstruated since, She drank six to eight cups of coffee a day, took no exercise, and her weight had risen from 160 pounds to 180 pounds during the past three years.

The findings of note on examination were that she was markedly overweight, had a slight thyroid enlargement, and a heart moderately enlarged to the left, with a rate of 96, regular rhythm, slightly indefinite apical first tone, but no murmurs. There was a moderate accentuation of the aortic second tone, but no signs of congestive failure, and no edema of the shins. The urine was negative, hemoglobin 76, erythrocytes 4,050,000, blood pressure systolic 184, diastolic 84. X-ray of

the heart (Fig. 2) showed MR 3.9 cm., ML 10.5 cm., a total transverse diameter of 14.4 cm., which was 50 per cent of the internal chest diameter. The electrocardiogram (Fig. 3) showed a normal sinus rhythm, auricular and ventricular rates being equal at 66 beats per minute. There was a PR interval of .16, R .08, and pressure 146 and diastolic 90, heart rate 72, action quiet, easy, and no murmurs.

Discussion.—While in this case, the absence of the so-called coronary T wave in the electrocardiogram does not preclude the existence of angina pectoris, yet its absence would certainly demand the presence of the

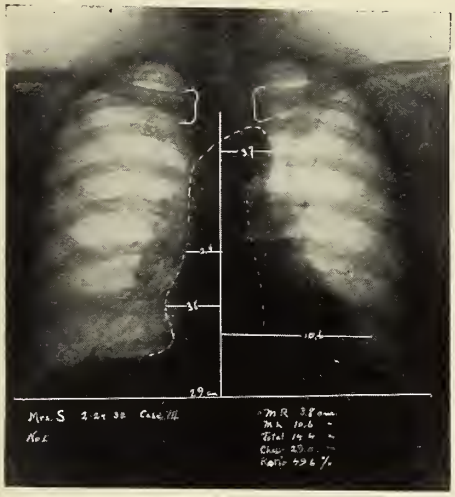


Fig. 2

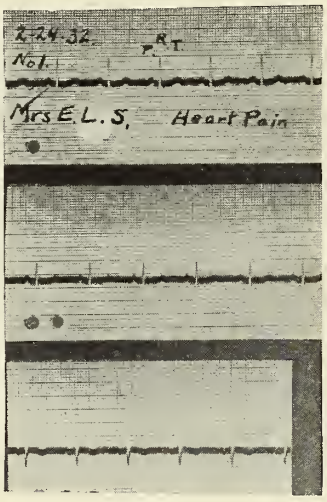


Fig. 3

the T wave low in all leads, but showed no crescentic downward deflexion, characteristic of a coronary T wave. A left ventricular preponderance was present.

The blood chemistry was normal, Wassermann negative, first basal metabolic rate was plus 16, and the second, some days later, was a minus 11 per cent. The patient showed a normal capacity both to dilute and concentrate urine.

After securing these findings, I told the patient definitely that I believed she did not have angina pectoris, that her pain was not the right type nor in the right location to be classified as angina, advised her to stay in the hospital and have her overwrought nervous system dealt with and at the same time secure a much needed weight reduction. With a preliminary two weeks absolute bed rest, simple sedatives, 1,000 calory diet, and general daily massage, her insomnia was controlled by the tenth day, and the pains in the left chest and arm disappeared, and the blood pressure dropped to 130 systolic and 84 diastolic.

At the end of six weeks her weight was reduced to 162 pounds, and the blood pressure was 125 systolic and 75 diastolic. She was able to walk six blocks daily without pain. She left the hospital at the end of eight weeks, during the last two of which she was taking no medicine of any sort, walking daily between twenty and thirty blocks without pain and sleeping soundly all night.

Six months later, she reported at the office stating that she had continued to feel well, to be free from pain, was walking two miles a day, and sleeping well. Her weight remained at 162 pounds, systolic blood other cardinal signs and symptoms and the persistence of the syndrome, in order to justify the diagnosis of angina pectoris; lacking these, the diagnosis must be discarded. We can classify the pain in this case as a myocardial fatigue pain which frequently occurs in women while under stress and strain, and during states of nervous irritability such as occur during the menopause.

Seemingly too in this case, the increase in body weight with the resulting higher left diaphragm was an additional aggravating factor. Doubtless, too, the association in her own mind of her condition and her husband's death, kept her in a state of fear which increased her insomnia and helped to keep her blood pressure raised. Two years later there had been no return of the precordial pain.

Case 4.—Mrs. J. E. F., aged forty, housewife, presented herself at my office on October 14, 1931, desiring an opinion as to her heart, which she stated beat wildly from time to time and that, in addition, she was troubled with insomnia, and was very nervous.

She stated that she had had this trouble off and on for many years, that it began sixteen years ago when on account of obesity, following the birth of her first and only child, she took (on her own initiative) 30 grains of thyroid extract (P. D. & Co.) a day for three months, with a resultant weight loss from 179 pounds to 129 pounds, severe palpitation of the heart, nervousness, and general debility. She was so ill following this experience that she was forced to be under a doctor's care for three months.

It seemed, from her story, that there might have been some hypothyroidism following her pregnancy, for she stated that she was sleepy day and night, very sensitive to external cold, liked the temperature of the house 80 degrees, and that her weight before her pregnancy

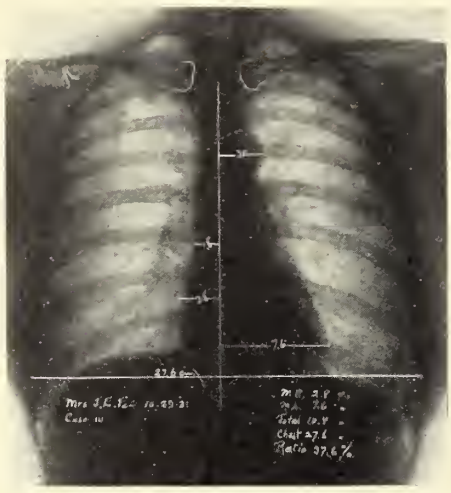


Fig. 4

was 135 pounds and after 165 pounds, but of course the dose of thyroid extract was too large.

Seven years later, her weight having gradually risen to 179 pounds, she repeated the thyroid treatment. Her weight promptly dropped to 130 pounds, and she had another illness in bed with a fast heart but eventual recovery. Since that time, she had been subject to palpitation of the heart either on exertion or while at rest. Swimming, walking, stair climbing, etc., produced acceleration of the heart rate.

As a child she was well and quite active and had no heart symptoms until this first experience of taking thyroid extract sixteen years ago. She was operated upon for a tubal pregnancy fourteen years before, and five years ago had had her appendix and a right ovarian cyst removed. She had the "Flu" in 1929 with a dragging convalescence, and before she could completely recover, she had to have a tonsillectomy. Four years ago, she was operated upon for gallstones, and during the post-operative period her heart beat so rapidly that an internist was called in consultation and prescribed digitalis without much quieting effect on the heart.

A year later, she was examined at a neighboring clinic and told that the cardiogram and x-ray revealed no evidence of any organic heart disease. Bromide was prescribed and her heart remained quiet for eight months, but eighteen months ago she had discovered a domestic triangle and since that time she has suffered from nervousness, palpitation of the heart, and insomnia.

The physical examination revealed a healthy appearing woman with no signs of dyspnea, or cyanosis. Her weight was 143 pounds. The heart percussed out R 3.0 cm., and L 6.5 cm.; the rate was 72, rhythm regular, apical tones clear cut and strong, and no murmurs heard. Her blood pressure was 112 systolic and 74 diastolic. The abdomen was normal except for a right rectus scar. Rectal examination revealed internal and external hemorrhoids, and a fissure.

X-ray of the chest (Fig. 4), showed a small, narrow, centrally placed type of heart, normal in outline with a total transverse diameter of 11.2 c.m. The electrocardiogram showed a normal sinus rhythm with a ventricular rate of 75, a PR interval of .18, R of .06, RT of .38 and the T wave upright in all leads. The hemoglobin was 83 per cent, erythrocytes 4,430,000, leukocytes 6,500.

Discussion.—It was obvious that this patient was suffering from a typical irritable heart and equally obvious that the heart itself was fundamentally sound. Her difficulty arose from the fact that she feared that in one of these attacks of palpitation she might die suddenly and thus leave her nineteen year old boy without any guidance in the world. It was further obvious that she believed her painful rectal condition to be the beginning of a cancer and she seemed to be quite sure that if she did not die from the heart condition the cancer would cause her death. I assured her, as a result of her history, clinical examination, and laboratory findings, that her heart was fundamentally sound, that I believed also that the rectal condition was a simple thing. Since her heart would withstand an anesthetic the proper procedure was to have the rectal condition explored under an anesthesia and properly treated.

Relieved from the worry about her heart, she readily consented to have the surgical investigation of the rectum, which proved to be merely a fissure and external and internal hemorrhoids. These were dealt with and in her convalescence she was delighted to know that she need have no cause for worry from that source.

She was kept on simple sedatives to quiet her irritable nervous system and was encouraged to get about very soon. Relieved from the fear of heart disease, she took up walking again, which she had abandoned because she feared it might aggravate her heart condition, and the walking and the sedatives served to keep her heart quiet and restore her confidence in herself. In spite of the fact that the strain of the domestic situation increased, her heart remained quiet, and she was able to sleep well, and had no attacks of palpitation. A year later, she was still well.

Case 5.—Russell O., aged 34, a machine shop worker, came to my office May 27, 1932, complaining of heart attacks which began while in college eleven years before. The first attack came on following a tusseling match with another boy. During this exertion, be became winded and his heart beat fast, though this did not alarm him at the time, but that evening on preparing for bed, his heart beat fast, and very hard, when he laid down. This fast beating came on gradually, and lasted about thirty minutes, and disappeared

gradually. A nearby physician who was called gave him a hypodermic injection and he finally went to sleep. The following day, he felt worried and tired and had a similar attack that night which required another hypodermic injection.

Believing that this condition was a serious heart condition, he went to a hospital in Fort Wayne, and was under observation for five days without any heart attacks, and no signs of heart disease were found, so he returned to school and experienced a similar attack when he went to bed that night. This convinced him that his heart was bad in spite of the negative reports at the hospital, so he gave up college and went home, where he has been most of the time since, working in a machine shop a few days at a time and quitting because of these heart attacks.

He stated that it was hard for him to sit still and read at night because his heart pounded, that he could not go to the movies because his heart pounded and made him nervous and that it took him one or two hours to get to sleep at night, because of this heart pounding. He recalls no other previous illnesses.

Interestingly enough, he was with the American Army on the Mexican Border in 1916, and overseas with the American Expeditionary Force in France for three months during the Great War, and stated that all this time he felt well, hiking and doing all the things that anyone else did.

He is an only child, and his mother is a neurotic who has been under a neurologist's care for a number of years. His father was a phlegmatic Scandinavian, and died three years ago as a result of an endocarditis on an old valve lesion. The patient was examined by his mother's physician in 1921, and told that the condition was of nervous origin, and sedatives were prescribed without effect. He submitted to a tonsillectomy in 1919. *He has used a box a day of Copenhagen snuff since the age of twelve years.*

Physical examination revealed a tall, well nourished, healthy appearing adult who stuttered as he talked and whose movements were quick and active. The pupils were equal, circular, and reacted to light and accommodation, but while the pupillary contraction came on quickly, it was not well sustained; a reaction suggestive of an unstable neuromuscular control. The teeth showed many crowns, had been x-rayed and were said to be sound. The gums were firm and free from infection. The tonsils showed complete removal. The thyroid was of normal size, and elastic in consistency. The lungs were resonant throughout and revealed no abnormal sounds.

The heart showed no visible or palpable apical impulse. The percussion outline depicted a narrow centrally placed type of heart, with a varying rate between 81 and 84 per minute. The rhythm was slightly uneven, characteristic of sinus arrythmia. On auscultation there was a short clear cut apical first tone but no murmurs, a reduplication of the pulmonic second but no other abnormal sounds. The abdomen was negative, the extremities showed no edema, and the knee jerks were present and equal. The urine was negative, the hemoglobin 85, erythrocytes 4,500,000, blood pressure 150 systolic and 90 diastolic.

He was hospitalized for four days' observation. The x-ray of the heart (Fig. 5) showed a long narrow centrally placed type of heart with a total transverse diameter of 12.2 c.m. which was 42.3 per cent of the internal chest diameter. The cardiogram showed a normal sinus rhythm, rate 72, PR interval of 0.18 seconds R of .06, RT of .33, and the T wave upright in all leads, a good looking cardiogram. The basal metabolic rate was minus 11 per cent, pulse during the test 76 to 74, and respiration 15. His blood pressure reading was systolic 120, and diastolic 80. The blood calcium showed 10.5 mgms.

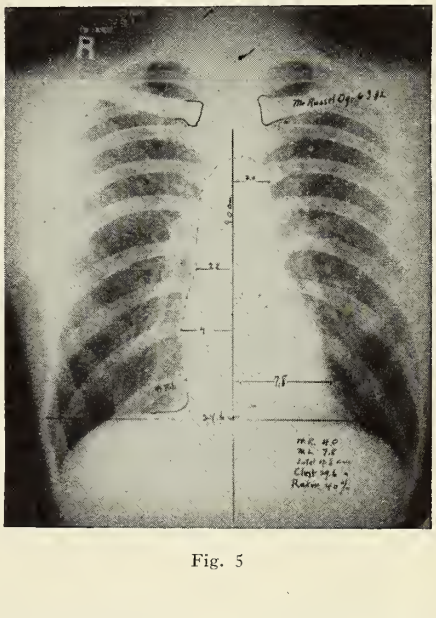


Fig. 5

Discussion.—It seemed that as a result of the clinical history, x-ray findings, and cardiographic records, that we were dealing with a heart that was fundamentally sound but over-acting, in other words, a typical irritable heart; but since it had not responded to sedatives and psychological handling in the past, we had to assume an additional factor of toxemia, and it seemed probable that this might come from continuous use of snuff. The patient was impressed with the deleterious effect of snuff, which was discontinued, and by the use of heavy doses of sedatives to quiet the nervous system and secure profound sleep at night, his heart became quiet and remained so, and thus we were gradually able to drive from his mind the old fear complex in regard to his heart, and substitute a state of confidence and calm. He quickly became rehabilitated and was soon able to walk two miles a day and climb hills without attacks of palpitation, and without any difficulty in going to sleep at night.

Case 6.—Laura U., aged 20, no occupation, presented herself at my office September 24, 1929, stating that she had been suffering from heart disease since 1924.

In the fall of 1924, she had had an attack of the so-called "intestinal flu" followed by an attack of chorea lasting five months, which was succeeded by a second attack of intestinal flu. During this latter illness, the family physician told her that she had heart trouble,

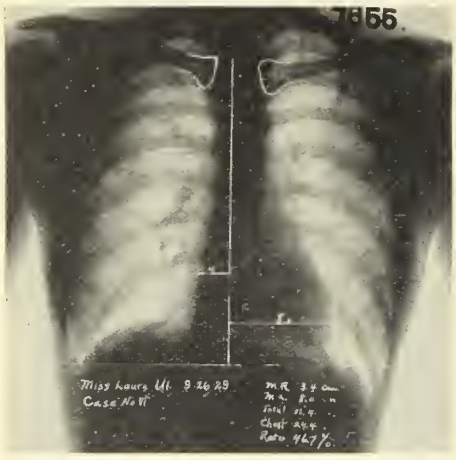


Fig. 6

and that she must live a careful life. She states that at that time she felt weak and run down and dragged about the house, and that she would be subject to attacks of pain in the heart when in bed at night, and at such times her heart would pound and beat fast.

She continued to lead a semi-invalid life and in the spring of 1929 she developed mumps and was in bed ten days. The first day she got out of bed, she had a fainting spell which frightened her and left her feeling quite weak so that she began to worry about her heart. In May, 1929, a physician was called, who put the patient to bed for six weeks, and told her that her heart was very bad, and gave her "green tablets" until she vomited. Following this experience she was allowed to get up gradually but was not able to do more than move about the house.

To summarize the above story briefly, she had been an invalid and confined to the house and premises for the past five years on account of this heart condition, and was complaining of weakness, nervousness, and apprehension, and her family were as solicitous about her as she was worried.

As far as her previous history prior to her present complaint is concerned she was well and strong up to the age of fifteen years, and worked with her father in the fields. At the age of ten she had had a severe tonsillitis and had had a tonsillectomy. Her weight was 110 pounds. Menstruation had begun at the age of fourteen and has been irregular. There had been no menstruation for the past three months.

The physical examination revealed a tall, fairly well nourished, poorly developed young woman who appeared calm and was slow and deliberate in speech and apparently slow in thought, but at the same time appeared very emotional and nervous. She had a mottled port wine discoloration of the hands and arms extending almost to the axillæ, and her hands were cold and clammy to touch. She had a very bad posture. She stood slumped over with the shoulders forward and the abdomen caved in, and sat in a similar position so that she had very little use of her diaphragm as an aid to return venous circulation.

The pupils were equal, circular, and reacted well to light and accommodation; teeth were sound; tonsils were absent; thyroid showed a moderate sized gland which was smooth and elastic; lungs were resonant throughout and there were no abnormal breath sounds. The heart showed an apex beat both visible and palpable through a thin walled chest just inside the nipple line and a systolic shock was felt over the apex. The right heart border was percussed 3 cm. and the left border 7 cm. from the midline. The heart rate was 100 beats per minute and the rhythm was of the sinus arrhythmia type. There was an audible slightly harsh systolic murmur over the apex, transmitted but a short distance towards the axilla. There was no accentuation of either the pulmonic second tone nor the aortic second tone. The blood pressure readings were systolic 120 mm. diastolic 80 mm.

The liver was not enlarged and there were no abnormal findings in the abdomen. The extremities showed flabby leg muscles, no edema of the shins and normal reflexes. The urine was negative; the hemoglobin 80 per cent, erythrocytes 4,500,000, leukocytes 8,300 and the Wassermann was negative.

She was observed in the hospital for a period of two weeks, where a normal sized heart was revealed by the x-ray (Fig. 6) and a normal cardiogram was also obtained, but interestingly enough the metabolic rate was minus 20 per cent. She was told that she had no signs of active heart disease, that her symptoms were due to an irritable heart, that inactivity and worry aggravated this irritability, and that what she needed was graduated exercise to strengthen her heart and keep it beating steadily, that her feeling of weakness was probably due to the low thyroid function, and should be relieved by the taking of desiccated thyroid gland.

During her stay in the hospital away from her oversolicitous family, she greatly improved and was sent home on bromide and thyroid gland, and instructed in calisthenic exercises to improve the posture and increase the use of her diaphragm. On this regime, she was able to walk out of doors, and by the end of two and a half months from the time of her first visit she had gained ten pounds in weight and was walking three miles a day, and helping with the housework. By February 1, 1930, four months after her first visit, she was walking five miles a day, and the port wine mottling of both arms and hands had completely disappeared, and she had gained an additional three pounds, all of which had been achieved by exercise and desiccated thyroid gland. Her blood pressure was 116 systolic and 64 diastolic, and the heart rate was 72 beats per minute. The apical systolic murmur was less harsh than at the first examination, and in addition there could be heard, when light pressure of the stetho-

scope was used, a slight "click" as though from an old healed spot of pericarditis.

Eighteen months after her first visit, she reported again at my office stating that she felt in perfect health and that for the past year she had been successfully doing the cooking and part of the housework for a family of four persons. Her weight at this time was 136 pounds, a total gain of 26 pounds, and her heart's action was quiet and efficient with an even rhythm and a rate of 60 beats per minute. She had been taking regularly a grain and a half of desiccated thyroid daily. Her basal metabolic rate was minus 16 per cent, but as long as she felt well it seemed unnecessary to increase the dose of thyroid, and she was advised to continue to take this amount daily.

Discussion.—A previously healthy adolescent girl suffered from a series of systemic infections for a number of months. During the course of these illnesses a mitral valvulitis with some myocardial insufficiency was detected by the family physician and the patient was informed that she had "heart trouble," and was advised to lead a careful life.

No constructive rehabilitation regime had been instituted and the patient had not been told that the majority of such patients recover satisfactorily and that she need not anticipate sudden death as the result of this heart involvement. She was left to flounder along as best she could, full of worry and apprehension and attributing her sense of weakness to her "heart trouble."

Naturally when later she suffered a simple syncope while convalescing from a mild intercurrent infection, her fears increased and she was then sure that the heart was growing worse. When the second physician entered the scene he found that the heart was overacting from the *fear drive* and, hearing a loud systolic murmur intensified by the rapid heart and listening to the recital of her past heart woes, was impressed with the seriousness of the situation and prescribed bed rest and digitalis, a regime effective if there existed congestive heart failure associated with an old mitral valvulitis, but ineffective when the fast rate was due to an irritable heart and the murmur due to an old healed non-crippling scar on the mitral valve.

The real underlying cause of the patient's weakness and incapacity was an unrecognized non-myxedematous hypothyroidism, probably originating at the time of her series of systemic infections which produced a smoldering infection in the thyroid, as well as in the heart, resulting in a decrease of thyroid capacity; but whereas the scar on the heart was easily recognized, the subfunction of the thyroid was overlooked and the patient subjected to five years invalidism and worry.

Her quick response to thyroid therapy and graduated exercise bears witness to the belief that the infection in the heart was a burned out quiescent condition and not at that time producing her symptoms.

Addenda.—This patient was seen in April, 1933, two years after her last visit. She has been married, has gone successfully through a pregnancy and labor and now has an eight months old baby, and has had no return of her former symptoms.

CONCLUSION

In conclusion, let me restate the following deductions.

First, that while the present day scientific approach to cardiology has greatly enhanced our knowledge and enabled us to make more exact diagnoses, yet it has not enabled us to abandon all the previously accumulated experience concerning heart disease.

Second, that the mere finding of grave structural changes in the heart, as revealed by clinical examination, x-ray, and the cardiogram, does not tell us whether this heart can carry on and how long it can carry on. This knowledge must still be determined by the clinical evidence of the heart's functional capacity.

Third, that the finding of a slight scar on a heart valve (evidence of a previously healed non-crippling valvulitis) does not of itself justify us in alarming the patient by diagnosing "heart disease" nor demand treatment unless congestive heart failure is likewise present.

Fourth, that rest and digitalis are not the panacea for every casually detected heart murmur or fast pulse.

Fifth, that it is not by means of altered cardiographic curves or changed x-ray outlines that we can always foretell the patients cardiac future.

In the final analysis we must estimate the heart's functional capacity to carry on, and on this, advise the patient and plan the treatment. Only wisdom, experience, and a study of each individual patient can accomplish this goal.

DISTINCTION OF THE NORMAL FROM THE DISEASED HEART*

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IT is frequently difficult to distinguish the normal heart from one that has been slightly injured by disease. It is likewise difficult always clearly to distinguish the slightly injured heart from the structurally normal heart that is disturbed by the augmentative influences of neurosis. Furthermore, derangement of remote components of the body may disturb the action of the heart to such a degree that false indictment of this organ is possible.

It is obvious that institution of proper treatment, and formulation of a relatively accurate prognosis, is impossible unless the diagnosis is correct. There is probably no branch of medicine in which it is more important to decide definitely when disease is absent and apprehension without cause. The error of judging an impaired heart as normal is not greater than judging a normal heart as impaired. The consequences in both instances may be very unfortunate.

The responsibility of rendering the opinion that a heart is normal cannot be avoided on the basis that the diagnosis may not be correct, and the risk of being wrong does not justify an attitude of protective contentment or of diagnosing heart disease on mere suspicion. Neither is it permissible to accept a diagnosis of disease made by someone else without confirmation, for the diagnosis of heart disease may be erroneous.

The necessity for diagnostic accuracy is greater today than ever before, owing to the actual increase in the incidence of heart disease. The public mind is well aware of the fact that heart disease at this time is the individual leading cause of death in this country and it is not difficult for some persons to misinterpret symptoms and to conjure apprehension which can be allayed only by an attitude of reassurance on the part of the medical examiner. It is obvious that the physician cannot be of genuine service to his patient unless he, himself, is assured of the correctness of his diagnosis.

One is never justified in using vague or inappropriate terms in discussing the results of examination with the patient. To advise the patient that he has a "weak heart" or that the heart has been "strained" is the physician's admission of his own ignorance. When heart disease is present, the nature of the disease should be explained to the patient in language that he understands, so that exaggerations shall not occur and sow the seeds of despair. Not infrequently, patients with cardiac neurosis are told they have "heart trouble" and that the "heart is weak," thereby convincing unfortunate sufferers that the future holds only dissolution, and each day of horror adds to their already useless invalidism.

ETIOLOGY

A critical inquiry concerning primarily etiologic diseases and intelligent interpretation of the results of this inquiry is of paramount importance in every case in which distinction between the presence of a diseased or of a normal heart is to be made. Fortunately, the list of etiologic diseases has dwindled with the passage of time, to some extent simplifying a hitherto pretentious array of medical terms. It is interesting to compare the chapters devoted to etiology in the older textbooks with the corresponding paragraphs of modern works. Such diseases as scarlet fever, influenza, measles, and typhoid fever no longer are considered to be certainly etiologic, as they were thirty years ago.

Of all the infectious diseases, rheumatic fever, chorea, and syphilis are considered of primary etiologic significance today. The ever increasing amount of material obtained at necropsy, and its critical correlation with symptoms and physical signs, has strongly fortified the position of the foregoing infectious triology, and has to a large extent shattered the assumed position of more or less speculative factors.

Rheumatic fever and its mysterious ally, chorea, continue to hold their frightful superiority in the production of heart disease among children and young adults. The incidence of carditis is so great following these diseases that their previous occurrence places the burden of responsibility directly on the physician to offer convincing evidence that the organ has miraculously escaped. The detection of mitral stenosis or aor-

*From the Section on Cardiology, The Mayo Clinic, Rochester, Minnesota. Read before the Oklahoma Clinical Society, Oklahoma City, October 31 to November 3, 1932.

tic insufficiency in examination of a young person is virtually positive evidence of previous rheumatic fever or its nonarticular counterpart. It is interesting to note that cardiac involvement usually occurs with the first attack of rheumatic fever, although recurrent exacerbations unquestionably contribute to the already existent injury. Rheumatic fever, affecting a patient who has hitherto escaped, is unusual after the thirty-fifth year of life, although recurrent episodes, even late in life, are not exceptional. Thus, elicitation of a history of rheumatic fever or chorea justly makes the physician deliberate, utilize his acumen of diagnostic experience, and muster his accessory methods of detection before pronouncing the heart healthy.

In considering syphilis as etiologic of cardiovascular disorders one is, in reality, concerned with the late stages of the disease, for the subjective and objective evidence of circulatory impairment is chiefly evidenced in middle life. So far as the cardiovascular apparatus is concerned, syphilis acts in a subtle and often unrecognized manner, the havoc of its subtle attack often occurring many years after contraction of the disease, and often after memory of the indiscretion has been gratefully erased.

Modern teaching, however, does not permit one to rest content with consideration of syphilis only in its advanced stages, for ample proof has been presented that early treatment, carried out persistently, is effective in many cases in avoiding the visceral complications of a later day.

Syphilis has no regard for caste or rank, and its possible influence in the condition of persons who are in middle life and who present themselves owing to actual or suspected heart disease never can be denied until proved to the contrary. Occupation or intellectual attainment can no longer be employed to tilt the balance to the side of exoneration. Modern laboratory methods such as the Wassermann reaction and its modifications, examinations of the spinal fluid, and so forth, have done much to increase accuracy of diagnosis, yet there is always that appreciable group of cases in which these specific procedures yield negative results, and ultimately evidence of active disease appears.

The occurrence of aortic insufficiency in middle life is usually, but not always, suggestive evidence of syphilis. Thoracic aneurysm is of course practically irrevocable evidence of the disease. Previously, the occurrence of the anginal syndrome was frequently considered to be due to syphilis, whereas today it is realized that it is of rare occurrence and is almost limited to those cases of aortitis in which the coronary ostia are narrowed.

Little comment can justly be made regarding the actual etiology of the most important cardiac diseases which confront the physician today; namely, coronary disease and hypertensive heart disease. Their increasing incidence seems to be well established, as is also their tendency to progress when once well under way. The mechanical effects of these diseases on the heart and circulation are well understood, but the specific influences causal to their establishment are still enigmatic. The apparent parallelism of their increasing frequency with the increasing stresses and strains of modern American life, with its ever-increasing competition, financial calamities, and artificial standards of living, have to some extent, at least, been suspected of being etiologic influences.

In this connection, the part played by heredity cannot be dismissed, for only too often records are obtained relating to the occurrence of coronary disease and hypertensive heart disease in succeeding generations of the same family. Careful inquiry into illnesses and causes of death of previous generations often elicit invaluable information pertinent to the diagnosis of heart disease. Present-day records are woefully lacking in genealogic data, which in part is the result of failure to inquire, but to a large extent the result of the United States being a relatively young and enormously large nation. Our European ancestry has necessarily divided family trees, and the blending of nations and races has frequently obscured important knowledge regarding the past. Members of the average American family of today have little if any knowledge of their forebears before the third generation.

The presence of goiter should at once focus attention on the heart, although by no means is the heart always concerned. A thorough knowledge of disease of the thyroid gland, with the supplemental use of accurately conducted studies of basal metabolic rate, usually clearly separates the cases with hyperthyroidism from those in which goiter is inactive. Not infrequently, the patient with cardiac neurosis is made the victim of an unnecessary surgical procedure by the

erroneous diagnosis of hyperthyroidism. This shows an utter lack of understanding of both thyroid and cardiac disease. Exophthalmic goiter occurs when patients are less than forty years of age in 61 per cent of cases, whereas hyperfunctioning adenomatous goiter occurs after the fortieth year in 78 per cent of cases.

Congenital heart disease is usually not difficult to identify, although determination of the exact type of lesion is frequently impossible. The discovery of heart murmurs in infancy, and other striking signs in the absence of infectious etiologic disease, often adequately establishes the diagnosis. Among children and young adults the possibility of congenital cardiac disease must never be overlooked.

The tendency for certain forms of cardiac disease to occur predominantly among persons of certain age groups gives additional diagnostic aid when these occurrences are understood. In childhood and adolescence, the high incidence of rheumatic carditis and congenital disease would cause the physician to consider these possibilities first. In the age period from twenty to forty years, the suspicion of rheumatic carditis would still linger, but in addition to this the possibility of exophthalmic goiter, and, among older patients of this group, of syphilis, would be challenged. In the succeeding age groups, coronary and hypertensive heart disease would first be suspected, syphilis would not be overlooked, and hyperfunctioning adenomatous goiter would enter into the consideration.

SYMPTOMS

In writing on the symptoms that are produced by heart disease, I do so in the attempt to bring forth facts that will be helpful in determining when the heart is normal. The most constant, and therefore the most important, symptom of heart disease is dyspnea. It can be safely stated that unless dyspnea is present the cardiac lesion is of relatively little significance or has existed a relatively short time. Even in cases in which the anginal syndrome is present, dyspnea occurring with effort is frequently evident between the painful seizures. It is true that dyspnea may occur among obese persons, or among those who have neglected their physical training, and the physician must be alert in recognizing these vagaries. Not infrequently, patients complain of shortness of breath, when in reality they become conscious of this normally automatic function and attempt to regulate it, thereby evoking the feeling of not being able to take a breath sufficiently deep to satisfy them. The series of successively deeper respirations is suddenly brought to an end by a yawn and then temporary relief for the patient is forthcoming. This is clearly a neurosis, and demands the same careful consideration that other functional complaints merit. Other causes of dyspnea unrelated to the heart will not be considered.

Cardiac pain is often one of the most significant clues to the establishment of the diagnosis of heart disease. In numerous instances this symptom is virtually the only condemning evidence. The characteristics of cardiac pain must be thoroughly understood, for it is admitted that all pains and painful sensations in the cardiac region are not the result of heart disease. Typical cardiac pain is paroxysmal, and usually is precipitated by influences that overburden the heart, such as exertion and excitement. The pain or oppression seems to be situated behind the sternum, or in close proximity, and typically radiates into one or both arms, although the areas of distribution are variable. The paroxysm is usually of short duration, disappearing as the heart responds to rest. One must not overlook those patients with the anginal syndrome who have pain when exertion is first undertaken, but who, when the initial pain subsides, are capable of enduring considerable additional and continued effort without experiencing further pain or discomfort. These circumstances frequently erroneously lead the physician to believe that the heart is healthy, and the patient, whose activities should be rigidly limited, is unwittingly permitted to pursue undertakings that are extremely hazardous to his existence. Similarly, the interpretation of pain resulting from intercostal myositis, herpes zoster, pleuritis, and so forth, as being due to cardiac disease, leads to an equally unfortunate situation, and many otherwise useful citizens are reduced to a state of chronic invalidism.

Palpitation is probably one of the most common cardiac symptoms that the physician is required to interpret. It is more often indicative of nervous disturbances than of disease of the heart. It may manifest itself as simple consciousness of the heart, or it may disturb the serenity of the patient in the guise of extrasystoles. Although extrasystoles occur when serious disease

of the heart exists, it is equally true that they occur as frequently when the heart is structurally normal. It is therefore important never to accept this arhythmia as the sole criterion in establishing the diagnosis of heart disease. Patients with serious heart disease should not emphasize palpitation as their outstanding complaint.

Dizziness is frequently considered a symptom of heart disease. This is actually rarely the case, with the exception of its occurrence in cases of complete heart block, in some cases of paroxysmal tachycardia, and occasionally in cases of hypertension, especially when this is associated with sclerosis of the cerebral arteries. In general, dizziness should direct attention away from the heart, yet it is not infrequently the basis for the diagnosis of heart disease.

Similar comment is applicable regarding syncope as a symptom of heart disease. It is practically limited to the Stokes-Adams syndrome of heart block, and to cerebral anemia occasionally occurring in cases of paroxysmal tachycardia. The tendency of frail, nervous children to faint is frequently interpreted as indicating ominous disease of the heart, and unnecessary concern is evoked and restrictions imposed, when in reality the introduction of proper measures of hygiene would satisfactorily solve the problem.

It would seem almost irrelevant to make comment on edema as a symptom of heart disease, yet I feel justified in calling attention to certain pitfalls of diagnosis. No one would challenge the statement that dependent edema, enlargement of the liver, and dyspnea are the cardinal symptoms of congestive heart failure. However, all physicians are familiar with instances in which edema is confined to the feet, ankles, and lower parts of the legs, appearing during the day when the patient is up and about and disappearing after a night's rest; I have witnessed numerous instances in which this status obtained. On this evidence alone indictment of the heart has been made. Such cases are frequently examples of deep venous thrombosis and lymphedema, and the heart is in no way concerned with the serous infiltration.

It is therefore apparent that the symptoms of heart disease must be carefully evaluated, similar but not identical subjective phenomena at times falsely indicating impairment of the heart. It is again evident that caution is necessary in arriving at the opinion that the heart is healthy, yet the importance of honestly rendering this opinion whenever evidence to the contrary is lacking cannot be denied.

PHYSICAL SIGNS

The recognition and evaluation of physical signs is one of the most important considerations in the diagnosis of heart disease, and in rendering the verdict that the heart is normal. The premise may be justly established that an enlarged heart is a diseased heart, and in so doing the physician obligates himself to be absolutely certain when he passes judgment that the heart is enlarged. Not infrequently medical examiners disagree on size of the heart of a given patient, and yet the validity of diagnosis may rest on this point. With the advent of roentgen rays, there has been a tendency to neglect the art of physical diagnosis, and acceptance of nonstandard roentgenograms has frequently resulted in deformed cardiac shadows that erroneously appear enlarged. It is now generally conceded that the teleroentgenogram gives the most accurate information regarding size and contour of the heart. This form of roentgenogram is a record, on film or plate, of the shadow of the heart and great vessels, cast by means of roentgen rays, with the tube sufficiently remote from the thoracic wall and the plate to minimize distortion to the least possible degree. The usual distance is 6 to 7 feet. The art of cardiac palpation and percussion should be highly developed by all clinicians, in spite of the fact that roentgen rays are available to them; in the majority of cases the size of the heart, as determined by palpation and percussion, should not vary more than 1 cm. from that recorded by the teleroentgenogram. In the interpretation of the cardiac contour and its size, numerous factors concerning the individual patient must be taken into consideration. The size of the normal heart varies according to age, sex, weight, height, and the build of the patient. Failure to recognize these variables necessarily leads to diagnostic error.

In the majority of cases of well established heart disease, enlargement of the heart is so obvious that no difficulty is experienced in determining the fact, but in the early case of cardiac impairment, and in the case in which impairment is only suspected, the necessity for accuracy and convincing evidence is of paramount importance.

In the appraisal of the healthy heart important information is gleaned by careful study of the heart sounds. The clinician must be well aware of the normal heart sounds and their physiologic alterations. Tones that are distant, or that lack the normal definition and differential characteristics, may be early and subtle evidences of serious cardiac disease. These apparently minor variations must be fully appreciated.

The presence of cardiac murmurs is usually, but not always, proof of heart disease. An interesting evolution has occurred relative to the significance of murmurs; the time is not remote when the greater part of cardiologic teaching was occupied by these adventitious sounds. Now, the emphasis is rightly placed on the diastolic murmur and its closely related presystolic murmur. The former is the characteristic murmur of aortic insufficiency and at times the murmur of mitral stenosis, whereas the presystolic murmur is positive proof of the existence of mitral stenosis.

The interpretation of systolic murmurs, particularly of those occurring at the base of the heart, to the left of the sternum, must be cautious, for these murmurs often have little clinical significance. They may be the result of augmentations in flow of blood, or they may result from respiratory movements under certain anatomic conditions, and in no way from cardiac impairment. The left basal cardiac area has been appropriately named the region of auscultatory romance.

Right basal systolic murmurs, particularly when they are loud and are transmitted into the carotid vessels, or extensively over the thorax, are almost invariably indications of disease. The same is true of the apical systolic murmur, especially when it wholly replaces the first sound and when it is transmitted into the axilla. When an apical systolic murmur, or one situated at the left basal area is the only evidence available, the major chances are that the heart is not structurally impaired. Nevertheless, insurance companies even today place convincing emphasis on these findings and frequently reject perfectly normal applicants or penalize them with exorbitant premiums so that they are denied protection. The justification of the insurance companies, of course, lies in the fact that their actuarial experience of many years is largely based on mass statistics dealing with murmurs per se. The failure and impossibility to separate data on this basis results in mortality figures unfavorable to murmurs in general. It is hoped that thirty years hence sufficient accurate and diversified data will be available to alter the present-day criteria of acceptance and rejection.

The presence of thrills almost invariably indicates disease of the heart or great vessels.

Cardiac arhythmia frequently leads to the diagnosis of heart disease, when in reality the heart is not impaired. Sinus or respiratory arhythmia is frequently present even when hearts are normal, particularly hearts of infants and children, although this type of arhythmia occassionally is an accompaniment of heart disease, especially among older patients. The occurrence of extrasystoles when the heart is normal has already been mentioned.

The detection of auricular fibrillations or flutter would render untenable the opinion that the heart is healthy, owing to their almost constant association with heart disease. However, there are instances in which auricular fibrillation occurs as a transient phenomenon, and ultimately no evidence of impairment of the heart can be determined. This is particularly true in some cases of hyperthyroidism.

One would also hesitate to render the opinion that the heart was normal in the presence of well established hypertension, owing to the known mechanical effects of this condition in causing the development of cardiac hypertrophy and its consequent impairment of function.

In the appraisal of the patient who maintains that he has had heart disease for a considerable number of years, and whose history and whose present examination fail to show evidence of heart failure, one at once becomes skeptical regarding the existence of heart disease. It is of course possible that heart disease had existed or still exists, but in the majority of cases it would argue strongly for a normal heart.

The opinion that the heart is normal can be entertained when no history of illness capable of producing heart disease is elicited, and when no true cardiac symptoms and no conclusive physical signs of heart disease are present.

The electrocardiograph has proved to be a very helpful adjunct in completing the data necessary to arrive at the opinion that the heart is healthy. The high incidence of graphic alterations in the presence of heart disease places additional value on the electrocardiogram when it is normal in all respects. In considering the patient of middle

life, concerning whom the suspicion of coronary disease is always a formidable factor, the cardiovascular appraisal is never complete unless electrocardiographic study has been carried out. There are many instances in which the electrocardiogram discloses the first conclusive evidence of the disease. It is similarly important in certain cases of hypertensive heart disease, and particularly in that group of cases in which coronary disease coexists. I do not wish to imply that a normal electrocardiogram precludes the presence of heart disease, for such an interpretation would be utterly fallacious. However, a normal electrocardiogram in the absence of other conclusive signs or symptoms of impairment of the heart adds considerable weight to the opinion that the heart is healthy.

In concluding the consideration of the means of arriving at a conviction that the heart is healthy, it is apparent that these means consist in the skillful use of the methods which comprise the art, and the knowledge which comprises the science, of medicine. By eliminative deduction, bits of evidence, incriminative and exonerative, are judiciously weighed and accepted, or discarded, as the case may be, and the ultimate conclusion is reached by logical and scientific means. The physician must reach the conclusion with certainty and conviction, so that he is able to render his verdict in absolute terms and remove the horrors of doubt from the patient's mind.

No diagnosis exists that is more valuable than knowledge that the heart is normal.

THE HISTOLOGIC GRADING OF SQUAMOUS CELL CARCINOMA OF THE LIP*

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SINCE the beginning of the microscopic examination of tumor tissue, pathologists have formed opinions regarding the malignancy of neoplasms. Hanseman (1902) was perhaps the first to express a conviction regarding the relation between the microscopic structure and the malignancy or clinical course of their growth. He wrote: "Tumors disseminated through the body show a high degree of anaplasia; those of unusual local growth without dissemination have little anaplasia. Theoretically, I take it for granted that the greater the anaplasia the greater the tendency to form metastases." Hanseman in following up some of his cases found his theoretical deductions to be true in the majority of cases.

In 1920, Broders, entirely unaware of Hanseman's work, published a method of grading the malignancy of carcinoma of the lip according to the amount of cellular differentiation and lack of differentiation. In the last ten years he has applied this method of grading to large groups of carcinoma from various locations with uniformly good correlations between the histologic picture and the clinical postoperative course. Numerous workers have confirmed Broders' work (Greenough, 1925; Martzloff, 1923; Weber, Davis, Barringer, and Caylor). The method has met with the approval of many surgeons throughout the country (Judd, Horsley, Dietrich, Duncan, and Ward); and consequently has already influenced surgical practices.

On the other hand, many pathologists have been unable to find any relation between the microscopic structure and the prognosis of a tumor. Two of the more recent papers on this aspect of the question are those of Plaut (1927) and Reimann (1928). Plaut has written an extensive critical analysis of the literature on the histologic prognosis of tumors.

The microscopic sections of eighty-four cases of carcinoma of the lip which had been treated at the University Hospitals between 1916

*Presented by invitation before the Minneapolis Surgical Society on May 21, 1931, being the prize winning essay of the Minneapolis Surgical Society for 1931. A detailed report on the results of treatment obtained in cancer of the lip at the University Hospital has been made by Drs. O. H. Wangensteen and O. S. Randall.

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and 1928 were used for examination. Without reference to the history of the case, the microscopic sections of tumor were studied and assigned a particular grade according to Broders' classification, *i.e.*, Grade I, 0–25 per cent of the cells undifferentiated (75–100 per cent of the cells differentiated); Grade II, 25–50 per cent of the cells undifferentiated (50–75 per cent of the cells differentiated); Grade III, 50–75 per cent of the cells undifferentiated (25–50 per cent of the cells differentiated); Grade IV, 75–100 per cent of the cells undifferentiated (0–25 per cent of the cells differentiated). Pearly bodies, flat squamous cells, keratin, and prickle cells were considered as evidences of differentiation of the cells; hyperchromatic nuclei, irregular nuclei, increase in the nucleo-nucleolar and the nucleo-cytoplasmic ratios were all considered as evidences of undifferentiation. The mere presence of numerous mitoses was not taken into consideration very much except as the mitoses were of irregular and bizarre forms. Ewing states that "amitosis is frequently observed in rapidly growing tumors and in some cases may be the chief mode of cell division." While the belief prevails that the number of mitotic figures is a fair indicator of the degree of malignancy there is evidence that this may prove very false, according to some workers (Plaut, 1927).

RESULTS

Total number of cases studied—84.

All of the growths, except one, were primary on the lower lip. Information as to certain details is lacking in some cases.

The initial lesion was described as follows:

Pimple—3 cases
Cold sore—5 cases
Leukoplakia—2 cases
Crack—3 cases
Itching lesion—1 case
Not described—67 cases
Small nodule—3 cases

The average duration of the lesion before the patient saw a doctor was 1.45 years (ranging from 0 to 18 years).

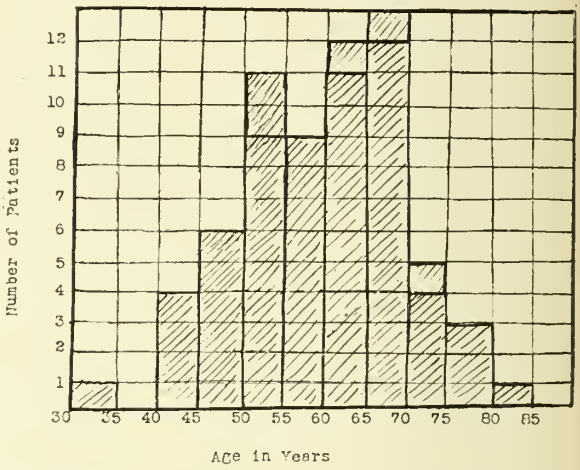
The average time elapsing from the time the patient first consulted a doctor to the time that adequate therapy was commenced was 1.05 years (ranging from 0 to 13 years).

The average total duration of the lesion before operation was 2.5 years (range from less than 1 month to 18 years).

Area of these lesions varied from 0.5 to 45 sq. cm.

The average surface area of lesions of Groups 1 and 2 was 3.75 sq. cm. and of lesions of Groups 3 and 4 was 3.8 sq. cm., which difference is well

THE AGE DISTRIBUTION OF PATIENTS WITH CARCINOMA OF THE LIP



within the limits of error of the method. The range of surface area in lesions of Groups 1 and 2 was from .5 to 12 sq. cm. and in lesions of Groups 3 and 4 was from .5 to 10. (The growth of largest surface area was not graded because microscopic sections were not available). Hence, there is no correlation between the size of a tumor and its microscopic grading, as has been suggested by some writers.

In Groups 1 and 2, 30 per cent of the lesions were described as being papillary and the rest ulcerated. In Groups 3 and 4, 25 per cent were described as being papillary and the rest ulcerating. Descriptive terms were given in only thirty-five cases.

In twenty-one cases the lesion began on the right side, in twenty-three on the left side, and in ten cases in the middle.

In 50 per cent (39 out of 78 cases) the lymph nodes were considered enlarged clinically. In ten of these thirty-nine cases in which lymph nodes were considered enlarged clinically, there was no microscopic evidence of metastasis, thereby illustrating the fact that enlarged lymph nodes are not necessarily metastically involved. Actually only 37 per cent or less of this group of 78 cases had metastatic involvement of regional lymph nodes as proved by microscopic examination. In this group of cases metastases always occurred

first in nodes on the same side of the neck as the primary lesion.

TYPES OF OPERATIVE TREATMENT AND RESULTS OBTAINED

I. *Cases which were treated by local excision of the primary lesion plus resection of the tributary lymph nodes.* (This includes only those which have adequate follow-up (9 cases).

1. Recurred three months after operation and died fifteen years later from carcinoma of the lip.
2. Living and well fourteen years after operation.
3. Died from carcinoma of the lip five years after operation.
4. Died in hospital three weeks after operation from another cause.
5. Living and well six years after operation.
6. Living and well four years after operation.
7. Died from cerebral hemorrhage seven and one-half years after operation.
8. Died one and one-half years later from pneumonia following bronchitis.
9. Died one year after operation from carcinoma of the lip.

Summary: Five four-year cures out of nine cases.

II. *Cases which were treated by local excision of the lesion alone (8 cases).*

1. Living and well without signs of recurrence twelve years after operation.
2. Died one and one-half years after operation from carcinoma of lip.
3. Living and well without recurrence twelve years after operation.
4. Died from carcinoma of the lip one and one-half years after operation.
5. Died from pneumonia five years after operation.
6. Died from pneumonia five years after operation.
7. Died from carcinoma of the lip one year after operation.
8. Died from carcinoma of the lip one year after operation.
   (Growth was present for ten years before and treated with x-ray for four years before operation).

Summary: Four four-year cures out of eight cases.

III. *Cases which were treated by local excision of the lesion and excision of the tributary lymph nodes (12 cases).*

1. Living and well six years after operation.
2. Living and well five years after operation.
3. Died in 1931 from coronary sclerosis (fifteen years after operation for carcinoma of the lip).
4. Living and well four and one-half years after operation.
5. Living and well four years after operation.
6. Living five years after operation but has carcinoma of lip at a new site.
7. Died from carcinoma of lip three years after operation.
8. Died from carcinoma of lip two years after operation.
9. Living and well five years after operation.
10. Living and well seven years after operation.
11. Living and well five years after operation.
12. Living and well five years after operation.

Summary: Ten four-year cures out of twelve cases.

Considering the fact that block dissection of the neck was generally done only in those patients with evidences of cervical metastases and that there is a much larger percentage of four-year cures in the group of cases in which a dissection of the nodes in the submental and submaxillary as well as local excision of the growth we see the advantage of these procedures over local excision of the growth unaccompanied by other procedures.

Brewer (1923) in a clinical grouping of compiled statistics from clinics where a five-year cure is reported found that in Group 1, in which the primary lesion only was removed, 66 per cent were well and without evidence of recurrence five or more years. In Group 2, in which the primary lesion and the anatomically related lymph structures had been removed but without lymph node involvement, 92 per cent resulted in five-year cures. In Group 3, in which the pri-

mary lesion and related lymph nodes had been removed but with positive evidence of involvement of the latter, 34 per cent showed five-year cures.

MICROSCOPIC GRADING

Slides were obtained for grading in 66 cases.
Grade 1—31 cases (46.9%)
Grade 2—18 cases (27.2%)
Grade 3—15 cases (22.7%)
Grade 4— 2 cases (3.2%)

Broders (1920) in 537 cases of epithelioma of the lip classified 15.8 per cent as Grade 1; 62 per cent Grade 2; 21 per cent Grade 3; and 1.1 per cent Grade 4. The difference in distribution between these two series may be accounted for by one or all of three facts: (1) the change in method of grading since 1920; (2) an actual difference in case distribution; and (3) a tendency on our part to grade the tumors lower, particularly when they are on the borderline between a Grade 1 and a Grade 2.

Thus far, adequate information concerning the patients after they left the hospital has been obtained in only thirty-four cases. I hesitate to base percentages and definite conclusions on such a number of cases and believe that the most information from this series of cases can best be obtained by inspecting the tabulation of the subsequent history of these cases in the groups as they were placed according to the microscopic examination.

GRADE I. TWELVE CASES FOLLOWED

No deaths from carcinoma within 5 years of operation except in one case, where the cause of death was doubtful.

17-196 Living and well in 1931, 14 years after operation (local excision and block dissection of neck).

17-248 Living and well with no signs of recurrence in 1931, 12 years after operation (merely local excision). Size .5 x 1 cm. Duration, 15 months.

22-248 Died from carcinoma of lip 5 years after operation (local excision and block dissection).

25-595 Living and well with no signs of recurrence in 1931, 5 years after operation (V-excision and dissection of submaxillary and submental glands).

26-286 Living and well with no signs of recurrence in 1931, 5 years after operation (V-excision and dissection of submaxillary and submental glands).

26-352 Living and well in 1931, 5 years after operation (local excision with radiation to neck), no signs of recurrence.

26-574 Died 8 months after hospital admission—cause not known, operation refused.

27-194 Living and well in 1931, 4 years after operation (local excision and block dissection).

28- 14 Died 8 months after operation from causes unknown—perhaps not care.

27-524 Died 22 months after operation—death attributed to carcinoma of the lip.

26-801 Living and well without signs of recurrence 6 years after operation.

27-524 Living and well without signs of recurrence 5 years after operation.

GRADE II. TEN CASES FOLLOWED

Two deaths from carcinoma of the lip; one recurrence.

23-290 Died 7.5 years after operation (local excision only) from pneumonia (age 89 yrs.) No recurrence or metastases at the time of death. Size 4 x 1.5 cm.

23-291 Died 5 years after operation, from pneumonia, no recurrence or metastases at time of death (local excision only). Size 1.0 cm. in diameter. Duration, 6 months.

24-215 Living and well 7 years after operation (V-excision and resection of submaxillary and submental glands). No recurrence.

24-299 Died 11 months after operation with extensive metastases in left side of neck. The nodes were hard and fixed at time of operation.

25-517 Living and well in 1931, 6 years after operation. No recurrence.

26-345 Living and well in 1931, 5 years after operation (local excision and node dissection).

26-579 Died 6 years after operation from causes unknown.

28-303 Living in 1932 but with recurrence in lymph nodes 6 years after initial operation.

27-402 Living and well 4 years after operation (local excision and node dissection).

27-386 Died from carcinoma of lip 2 years after operation (local excision and lymph node dissection).

GRADE III. TEN CASES FOLLOWED

Five died in 3 years or less after operation from carcinoma of the lip.

16-141 Died 18 months after operation with carcinoma of face and neck. (Nodes free at time of operation).

16-246 Died from carcinoma of the lower lip 16 years after initial operation—reoperated because of recurrence several times.

20-126 Recurred 3 months after operation (block dissection of neck). Date of death unknown. Size .5 x .5 cm. Duration 6.5 years.

20-184 Died of pneumonia 20 months after operation (block dissection, and local excision).

22- 6 Living and well, no recurrence 9 years after operation (neck dissection and local excision).

23-209 Died of carcinoma of submaxillary lymph nodes and general carcinomatosis 1.5 years after the onset. Size 1 x 1 cm. Duration 12 months.

23-224 Died 13 months after operation (block dissection of neck and local excision), from epi-

thelioma of lower lip with general metastases. Size not given. Duration 2 years.

27-220 Died from carcinoma of lip 3 years after initial operation (local excision and node dissection).

28- 75 Living and well 4.5 years after operation (local excision and node dissection).

28-189 Living and well in March, 1932, 4 years after operation (node dissection and local excision).

GRADE IV. TWO CASES FOLLOWED

23-446 Died of carcinoma of lower lip 1 year after operation (local excision). Total duration 2.5 years.

27-384 Died with extensive metastases 2 months after operation and 5 years after onset (initial operation, local excision and node dissection).

DISCUSSION

The above cases, while not of sufficient number to confirm absolutely a relation between the microscopic picture and clinical course of the tumor certainly indicate a relation strongly in favor of the correlation which Broders has expressed. He states that among the known causes of death in his 537 cases of squamous cell carcinoma of the lip, deaths from carcinoma were as follows: none of Grade I; 54.9 per cent of Grade II; 84.2 per cent of Grade III; and 100 per cent of Grade IV.

That grading of tumors is of scientific interest only and can not be used for practical prognosis (MacCarty, 1931), I cannot agree with. Anything that will tell a surgeon that a patient's chance of living five years or longer without recurrence is closer to 100 per cent than to 5 per cent is of undoubted practical value.

It must be kept in mind that these grades are merely relative and the grade must be combined with other clinical facts such as the presence of metastases, fixation of the growth, etc. However, the microscopic grade is not to be minimized in relation to clinical evidence as is illustrated by Broders, who states that a Grade I carcinoma of the rectum with metastases may have a better prognosis than a Grade IV carcinoma without metastases. It should be emphasized again that the grade itself should be based entirely upon the microscopic findings without any reference to the clinical findings. It is only subsequently that the grade of malignancy of the tumor should be correlated with the clinical findings in an endeavor to treat the tumor and prognosticate concerning the probable termination.

I estimated the degree of cellular infiltration (lymphocytes?) and the degree of connective tissue reaction of the host on a basis of one to four in these same 84 cases. The cellular reaction (lymphocytic infiltration) about the tumor was very easily judged and classified, but on checking it up afterwards with the history of the patient and with the above assigned grade of the tumor there was an utter lack of correlation. The same was found to be true of the fibrosis and hyalinization around the growth. However, the amount of fibrosis and hyalinization was very much more difficult to judge. All authors do not agree as to the significance of lymphocytic infiltration and fibrosis. Some claim that the lymphocytes open a path for the cancer (Borst quoted by Plaut (1927)). Hanseman regarded lymphocytic infiltration as an unfavorable sign while many recent workers, such as MacCarty (1931), believe that fibrosis, hyalinization and the amount of lymphocytic infiltration are in proportion to the degree of resistance of the patient.

CONCLUSION

The grading of tumors according to Broders' plan I believe to be well worth while in squamous cell carcinoma of the lip as an aid in practical prognosis. The point that needs emphasis is that microscopic grading should be done independent of clinical findings and only later combined with them in forming a prognosis. As far as I could discover from the study of these few cases, the amount of cellular and fibrous reaction around the tumor is of no prognostic value.

There is no correlation between the microscopic grade of the tumor and its size.

Carcinoma of the lip is a lesion whose incidence increases rapidly both absolutely and relatively with advancing age. The average delay before treatment was two and one-half years in this group of cases, patient and medical man having been about equally responsible.

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THE MODE OF SPREAD OF CARCINOMA OF THE RECTUM*

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IT is unfortunate that the diagnosis of carcinoma of the rectum is often made too late. Most sufferers from this neoplasm present striking symptoms, and the rectum is readily explorable by the index finger. Why then the late diagnosis? Some reasons can be offered for this: false modesty, or a tendency on the part of the sufferer to attribute symptoms to hemorrhoids or other less serious trouble, and failure of the physician to examine the rectum with the finger early, or his failure to recognize the lesion when the examination is made.

Rectal carcinoma is the most common form of intestinal malignant disease, and comprises about 4 per cent of all carcinomas invading the body. Its serious nature, its common occurrence, the major and habit-changing operation necessary for cure, the all too frequent late diagnosis, and the appalling number of patients who come for examination after the growth has extended to parts distant from the local lesion, led to this survey of its mode of extension and spread.

In a careful microscopic examination of 100 consecutive surgically resected specimens of carcinoma of the rectum and the surrounding tissues, McVay found metastasis to the lymph nodes in forty-seven. These were cases in which, after careful examination, operation was deemed advisable.

Statistics on operability vary widely, but investigators who have had considerable experience in the treatment of rectal neoplasms agree that the number of frankly inoperable cases is entirely too large. Rankin stated: "Among the less fortunately circumstanced, one finds inoperability ranging as high as from 75 to 80 per cent, while in private clinics and practice, 50 per cent is probably a fair estimate." In his review of 1,727 cases of malignant disease of the rectum, 782 (45.3 per cent) were considered inoperable, and surgical intervention was deemed unwise. In 343 (19.8 per cent) palliative procedures only were possible, leaving only 602 (34.9 per cent) in which resection or excision of the malignant growth was possible.

Low operability goes hand in hand with late diagnosis. From a study of the reasons for this, we were impressed with various bizarre and early forms of metastasis. McVay emphasized the fact that there is no relation between size of growth and extent of regional involvement of the lymph nodes. We, too, were impressed with the relatively common occurrence of distant metastasis, when local growths were small and patients gave a short history of trouble.

Rectal carcinoma becomes inoperable by: (1) local extension, with fixation to adjacent and perhaps vital organs; (2) extensive involvement of lymph nodes, and (3) distant metastasis through the blood stream. The pathologic characteristics of any growth and the patient's state of health are, of course, of importance when determining operability, but these factors are not of concern here.

We reviewed 260 cases of malignant rectal disease, selected from 447 consecutive cases in which operation had been performed. In the remaining 187 (42 per cent) there was no evidence of extension to adjacent structures, nor of local or distant metastasis.

W. J. Mayo has observed that local extension renders a lesion inoperable more often than metastasis. Studies by many others have substantiated his observations. Local attachment and metastasis were common in the group we studied. Local attachment and extension to nearby structures occurred in 109 cases, and peritoneal perforation in eighteen more. Sites of extension were as follows: to the pelvic walls, forty cases; to the bladder, twenty-four; to the prostate gland, seventeen; to the uterus, ovaries and vagina, ten; to the seminal vesicles, six; to the perineum, anus and urethra, one case. The peri-

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toneum over the tumor was extensively involved in eleven other cases. Attachments of the tumor to other structures were in most instances caused by inflammation and less often were caused by direct extension of the malignant process, so that in itself adherence of the lesion to adjacent structures is not a contraindication to surgical extirpation.

Many studies of the rectal lymph nodes have been recorded. Poirier, Cuneo and Delamer have divided the collecting trunks of the anus and rectum into three groups: the inferior, middle and superior. The inferior group drains the cutaneous margins of the anus, with efferent channels passing to the inguinal regions. The middle group empties from the anocutaneous region, the upper limit of which was the white line of Hilton. Part of the efferent vessels extend through the columns of Morgagni to the rectal mucosa, others ascend on the lateral wall of the rectum, traverse the anorectal nodes, and join with the collecting vessels of the upper part of the rectum to terminate in the nodes of the mesorectum. Less commonly, these efferent vessels follow the middle hemorrhoidal vessels, or emerge beneath the levator ani muscles along the inferior hemorrhoidal vessels. The superior group of lymphatic structures drains the mucosa of the anus and rectum, with the efferent vessels passing through the muscular coat and extending upward and backward to the nodes in the mesorectum.

Villemin, Huard and Montagné, by a method of injection, found that the drainage of lymph from the upper part of the rectum was strictly abdominal.

Miles more recently has described the means of spread of carcinoma of the rectum. He has noted that there are three lymphatic systems, the first of which is intramural, consisting of two distinct, freely communicating networks, one in the submucosa, and one between the muscular layers, continuous above with the networks of the pelvic colon and below with those of the perianal region and with the inguinal nodes. The intermuscular portion connects with the second portion of the lymphatic systems, which is subserous, and also lies between the external muscular coat and the perirectal fat. By means of this second portion of the lymphatic system, a detached carcinoma cell may wander before entering the extramural or third portion of the system. Extramural spread may take place downward, laterally, or upward. The downward channel accompanies the inferior hemorrhoidal vessels, and the tissues traversed are those of the ischiorectal fossa, the external sphincter muscles, and the perianal skin. From here the channels empty into the internal iliac nodes. In the lateral extension of the disease, the levator ani muscles and pelvic fascia, coccygeus muscle, pelvic peritoneum, prostate gland or uterine cervix, base of the broad ligament, and base of the urinary bladder are traversed. Efferent vessels from here reach the uterine-iliac group of nodes. The paths of the upward main channels of spread accompany the superior hemorrhoidal veins, and traverse the lower mesocolic and retrorectal nodes, the pelvic mesocolon, and from thence the nodes that lie at the bifurcation of the left common iliac artery and along the aorta. Miles also emphasized that progress of the carcinomatous cells may be arrested and produce nodules at any point. In estimating the extent of the spread, it is important to know that whenever metastatic growths are visible, distant invisible metastatic growths are likely to be present. Clinical experience in general agrees with this view, and with the method of spread of rectal carcinoma that it suggests.

In our series, the involvement of lymph nodes by carcinoma in 113 cases was as follows: perirectal, seventy-one cases; mesenteric, fifteen; inguinal, fourteen; iliac, five; aortic, five; axillary, two; and omental, one case. This involvement was verified in each instance by microscopic study. Involvement of perirectal nodes does not in itself indicate inoperability, as evidenced by its common occurrence in resected specimens. Metastasis to other lymph nodes usually renders the lesion inoperable. We have observed another case of anorectal carcinoma, with large growths like involved lymph nodes, in the skin, following the line of the perineal and scrotal raphé, and from the base of the penis to the nodes of each groin. In the cases of involvement of distant lymph nodes, the surgical procedures consisted of biopsy of the inguinal and axillary nodes, and in some instances colostomy, when obstruction was imminent.

It is commonly recognized that metastasis to the liver occurs by way of the blood stream. W. J. Mayo, McArthur, Smith and others have explained this on the basis of emboli of carcinoma cells being released from the rectal neo-

plasm, and being distributed through the portal circulation.

Demonstrable distant metastasis occurred in seventy-one of our series of cases: to the liver in forty-three; to the lungs in twelve; to the small bowel in seven; to the omentum in one case; to the eye in one; to the bones in two cases, and to the regional veins in one case. In three cases there was diffuse abdominal carcinomatosis, and in one case, a large number of cutaneous metastatic nodules. The involvement of bone was of the skull, with large, grossly palpable nodules, proved on microscopic examination to be adenocarcinoma. Pulmonary metastasis in this series was determined by roentgenologic studies. In another series of 110 cases studied by Buie in 1924, pulmonary metastasis occurred in nine. Palliative procedures, exploration, or biopsy were instituted in cases in which distant metastasis was obvious.

SUMMARY

Carcinoma of the rectum is the commonest form of intestinal neoplasm. Its diagnosis is often made too late. In 260 (58 per cent) of 447 cases of carcinoma of the rectum, local extension of the growth, or metastasis occurred. Any given lesion may become inoperable by one or all of three modes of extension: local extension, metastasis by the lymphatic system, or distant dissemination by means of the blood stream. The order of frequency of occurrence of extension by these three routes in our series was metastasis by way of the lymphatic system in 113 cases, by local extension in 109, and by distant blood borne metastasis in seventy-one. Inoperability may develop in any given case by involvement through all three routes. No attempt has been made to separate the cases in which metastasis or extension by more than one of the three ways occurred. Local metastasis by way of the lymphatic system of itself may not contraindicate operation, for, as in this series, in seventy-one cases metastasis to regional lymph nodes was found only in the specimens resected.

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VASOMOTOR RESPONSE OF NORMAL AND HYPERTENSIVE INDIVIDUALS TO THERMAL STIMULUS (COLD)*

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THE study of vasomotor irritability and blood pressure response has been handicapped by the lack of a suitable standard stimulus. Many methods of stimulation have been proposed, but owing to the complexity of these procedures, they have proven of little practical value.

Recently Hines and Brown reported a study of the vasomotor response of some ninety-seven individuals to the stimulus, cold, and found that this stimulus resulted in an apparently specific response. If the validity of the results of the study can be proven, the test will be of inestimable value in ascertaining the vasomotor irritability of individuals as well as in determining the existence of pre-hypertension in individuals susceptible by virtue of these excessive vasomotor responses.

This investigation of the response of blood pressure to the stimulus, cold, was ascertained in 130 dispensary and hospital admissions. The subjects were at rest for a period of at least one-half hour, and in most instances for a longer period. At the end of the rest period the blood pressure was taken with the cuff on the left arm, and then the right hand was inserted up to the wrist in a bath of ice water. The blood pressures were then taken at thirty second intervals for a period of three minutes. The temperature of the ice water averaged 4.3 centigrade. Twenty-two of the patients were women with a definite hypertension, while the male hypertension group numbered twenty-four. Only those individuals who had a persistent elevation of the systolic blood pressure of 150 mm. of mercury or more, and in whom there was a cardiac hypertrophy with fundal arteriosclerosis, were selected as hypertensives. A normal control group consisted of thirty-two males and twenty-eight females. In addition, the responses of eight patients suffering from lues and ten patients with various other diseases were ascertained. Six cases were omitted from this report because of incomplete data. The responses were classified as to the age and sex of the individuals.

Table 1 shows the age and sex distribution of the hypertensives and normal cases.

TABLE I. DISTRIBUTION OF CASES ACCORDING TO AGE AND SEX

	MALE		FEMALE	
AGE	HYPERTENSION	NORMAL	HYPERTENSION	NORMAL
9-19	0	1	0	0
20-29	1	2	0	8
30-39	0	4	3	5
40-49	3	10	2	4
50-59	5	9	5	3
60-69	9	3	2	5
70-79	4	3	6	3
80-89	2	0	4	0
Total	24	32	22	28

Figure 1 represents the average systolic and diastolic pressures of both the normal and hypertensive males, classified as to decades. The systolic increase in pressure of the hypertensive series is indicated by S.H., and the systolic increase of the normal series by S.N. The diastolic pressures are similarly indicated D.H. and D.N., respectively. It will be noted that the average systolic pressure of the hypertensive individuals shows a greater rise than the normal and that the pressure after rising returns to normal more slowly, giving the hypertensive curves a plateau effect. In the 40 to 49 decade curve for the hypertensive systolic rise, the dotted line indicates the response of an individual supposedly suffering from hypertension. It will be noted that the response of the individual is also hypertensive in quality. In the male series, of the ages 80 to 89, the dotted line indicates the average hypertensive increase in response to the stimulus. The unbroken line indicates the response of individuals suffering from hypertension, who are in a state of decompensation.

Figure 2 represents the average responses of

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both normal and hypertensive females, by decades. Here again it will be noted that the systolic hypertensive responses to the stimulus are characterized by a greater increase in pressure and hypertensive individuals following the application of the stimulus. The average systolic increase in the male hypertensive group is greater than the increase in the normal group. The mini-

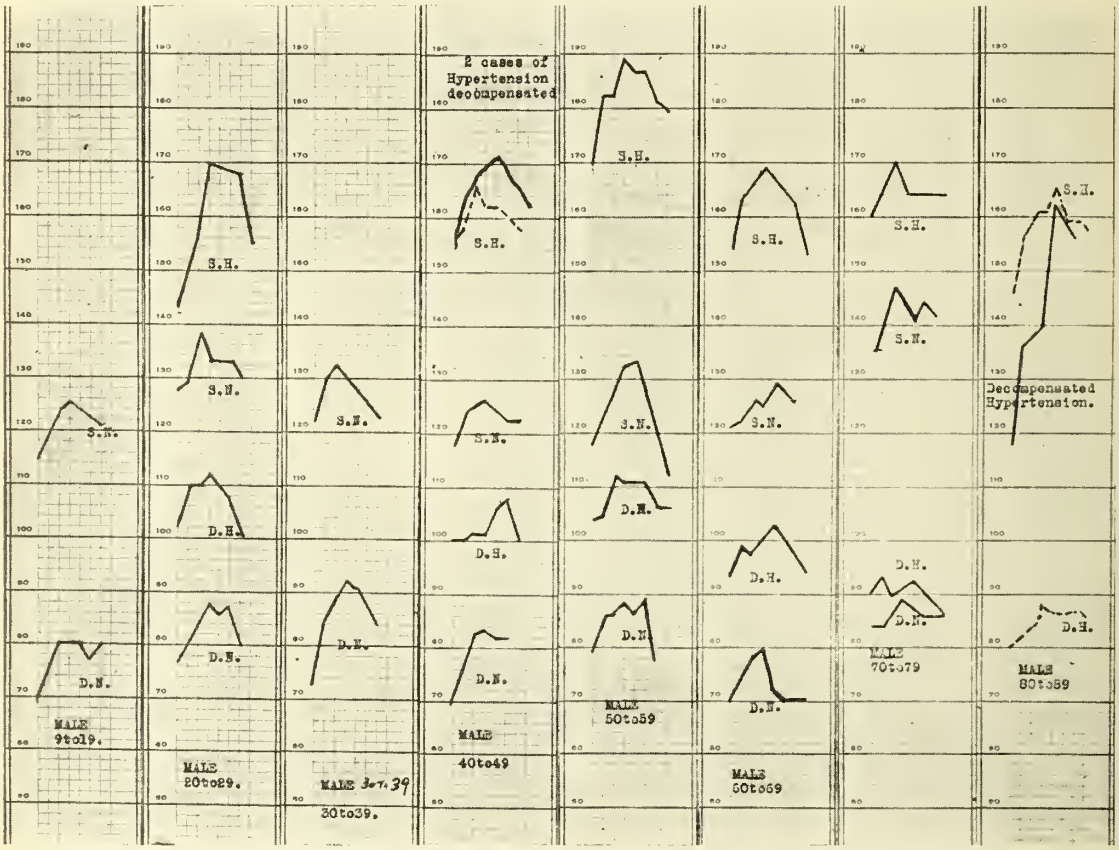


Fig. 1. Curves representing the average response of normal and hypertensive males in the series.

as well as a slower return of the pressure to normal, as compared to the normal. In both the male and female series, the diastolic pressures show no characteristic type of response.

TABLE II

	MALE				FEMALE			
AGE	S.N.	D.N.	S.H.	D.H.	S.N.	D.N.	S.H.	D.H.
9-19	10	11	0	0	0	0	0	0
20-29	10	11	28	10	9	9	0	0
30-39	12	19	0	0	11	14	12	12
40-49	8	13	17	8	7	5	21	8
50-59	15	10	20	8	7	3	18	6
60-69	7	10	15	9	9	7	17	9
70-79	11	5	12	3	10	5	9	6
80-89	0	0	19	8	0	0	9	5

Table showing the average systolic and diastolic rise in pressure (mm. Hg) in response to stimulus (cold) in normal and hypertensives according to decades.

Table 2 shows the average increase in systolic and diastolic blood pressures in both the normal

mum increase in systolic pressure for the male hypertensive series is 12 mm. of mercury, as compared with 7 mm. in the normal male group, the maximum 28 mm. compared with 15 mm. in the normal series. The diastolic increase in blood pressure for the male hypertensive series is less than the increase in the normal male series. The minimum diastolic increase for the hypertensive is 3 mm. of mercury as compared to 5 mm. in the normal male series; the maximum 10 mm. compared to 11 mm. in the normal male group. In the female series, we find again the greater increase in the average systolic pressure in the hypertensives except in the 70 to 79 age group, where the normal rise is 1 mm. of mercury more than that of the hypertensive group. The plateau effect of the hypertensive response, however, is still present. The minimum average systolic in-

crease in the female hypertensive series is 9 mm. of mercury, while the average increase in normal series is 7 mm.; the maximum is 21 mm. as compared with 11 mm. in the normal female.

ber of females, while the Arabic numerals indicate the males. The maximum rise in the normal systolic pressure occurred in the fourth period in five cases, etc.

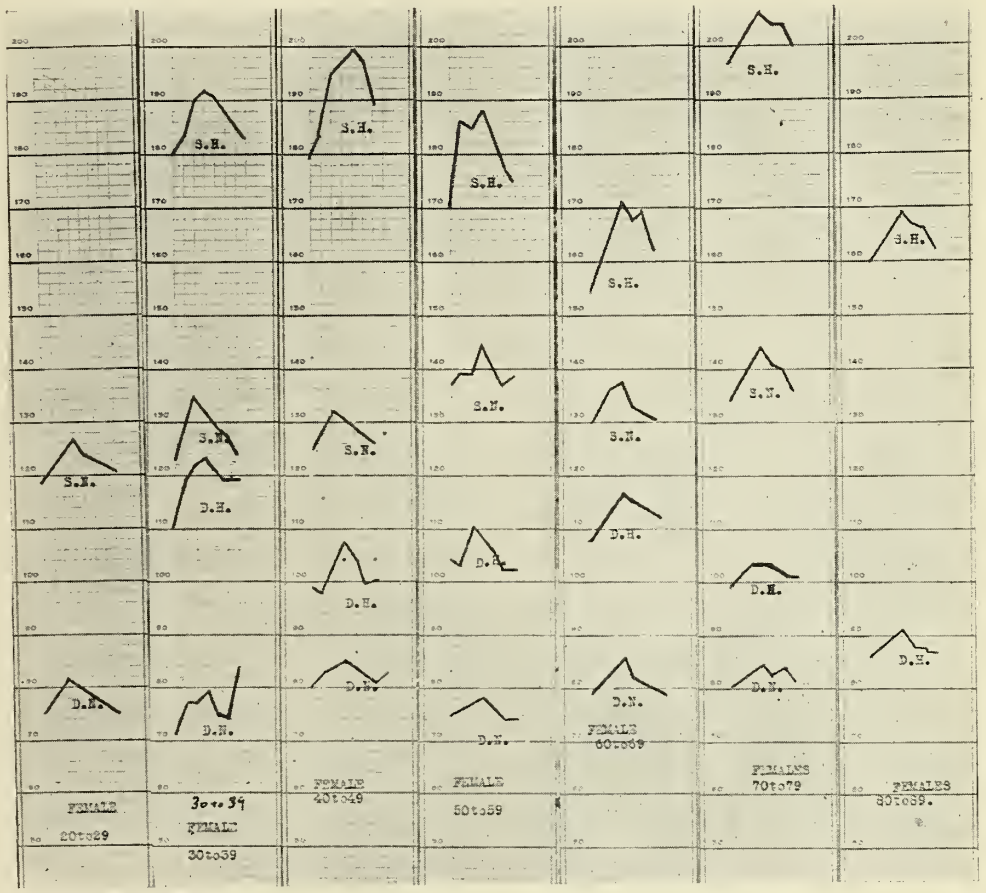


Fig. 2. Curves representing average response of normal and hypertensive females in the series.

In contradistinction to the male group, the diastolic increase in blood pressure in the hypertensive female series is greater than the increase in the normal female series. The average minimum diastolic increase for the hypertensive female is 5 mm. of mercury, while that of the normal female series is 3 mm. The maximum diastolic increase for the hypertensive female is 12 mm. of mercury, as compared to an average increase of 14 mm. of mercury for the normal series. In the 30 to 39 age group, the hypertensive diastolic increase is greater than the same increase in the normal series.

Table 3 represents the time interval in which the maximum response in blood pressure occurred. The Roman numeral indicates the num-

TABLE III

Time	1	2	3	4	5	6	7
Normal							
Systolic		II	3	IV 1	2	0	
Diastolic		0	III 1	III 4	0	1	
Hypertension							
Systolic		0	II 1	III 3	2	0	
Diastolic		II 1	I 1	II 2	1	1	

Table showing the time (30 second periods) of greatest rise in systolic and diastolic pressures. Roman numerals indicate number of females and Arabic the males.

The plotted average returns reveal that in most instances, besides the greater systolic re-

sponse in hypertensives, there is a tendency of the hypertensive curves to assome a plateau effect due to a slow return of the pressure following the initial response. Figure 3.—Graph I indicates the average systolic and diastolic rise in blood pressure of eight tertiary luetics in whom there was no involvement of the heart or aorta. The diagnosis in each case was central nervous system syphilis. The maximum systolic increase in pressure is 49 mm. of mercury, and the maximum diastolic increase 25 mm. The original blood pressure returns of those in this series fell within normal limits, while the response to the stimulus was exaggerated and corresponded to the responses of hypertensive individuals. Graphs II and III of Figure 3 represent the responses to cold of two individuals suffering from syphilis of the central nervous system, and show the same marked exaggeration in responses as those in Graph I of Figure 3. Graph IV (Fig. 3) is the response of a male, aged 39, suffering from luetic aortitis and insufficiency. Here there is a maximum systolic rise of 20 mm. of mercury occurring during the 4th period, and a maximum diastolic rise of 40 mm. occurring during the 6th period. The diastolic increases in the central nervous system series and in the patient with aortic insufficiency are closely related, but apparently the systolic rise differs markedly.

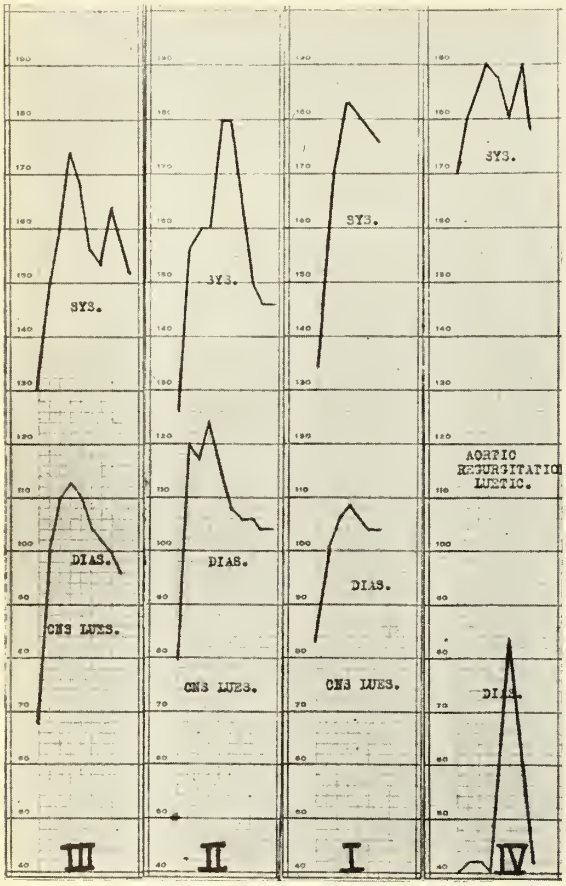


Fig. 3. Graph I. Curves representing average blood pressure response of eight patients suffering from tertiary lues.
Graphs II and III. Responses of two individuals suffering from central nervous system lues.
Graph IV. Response of patient with aortic insufficiency of luetic origin.

Figure 4.—Graph I represents the responses of a male patient, who entered the hospital with cardiac decompensation. The responses show a marked increase in systolic pressure with a plateau effect to the curve, characteristic of either the hypertensive reaction or the reaction of patients with central nervous system lues. Autopsy examination proved the case to be one of essential hypertension. Graph II represents the response of a male, sixty-nine years of age, who entered the hospital decompensated. Systolic 1 is his response on the day of admission. Systolic 2 is his response taken twenty-four hours before death. The response at the time of admission shows a bizarre type of curve not indicative of any specific response. Autopsy showed him to be suffering from essential hypertension. Graph III represents the systolic and diastolic response of three individuals who entered the hospital in cardiac decompensation. The type of response indicated a hypertensive character, and clinical study and the return of compensation proved all three cases to be hypertensive in etiology.

Figure 5.—Graph I is the vasomotor response of a woman who developed hypertension during her last pregnancy. At the time of her stay in the hospital, there was no evidence of a cardiac or renal failure, and eye-ground studies showed no changes in the arterioles. Following delivery the blood pressure remained elevated, but as yet there is no clinical evidence indicating vasospastic phenomena. The curves are characteristic of hypertension. It is interesting to note that her mother died from high blood pressure. Graph II is the vasomotor response of a ten year old child, which is exaggerated and simulates the hypertensive type of curve. Both parents are suffering from essential hypertension. This is the only record we have that apparently simulates the prehypertensive curves of Hines and Brown.

The physiological mechanism by which these

vasomotor responses occur is unknown. The response is the same regardless of which limb is used, or even if all four limbs are subjected to the stimulus. Hines and Brown ruled out local chemical and hormonal influences by constricting the stimulated arm by means of a tourniquet, thus closing off the circulation, and were able to obtain the same responses as were previously ascertained in these individuals. In twelve of our subjects we repeated the experiment with the stimulated arm constricted and found that there was no change in the character of the responses. In addition, the length of time that the hand is immersed in the ice bath is too short to produce either a chemical or hormonal change sufficient to bring about the exaggerated responses obtained. The majority of the patients complained of pain in the stimulated area. Many of the hypertensive patients became irritable and cried because of the cold sensation in the hand, while others attempted to shorten the period of observation by removing their hands from the ice bath. These complaints were more frequent in the hypertensive patients than in the normal group. Dawson has noticed that in predisposed individuals the reflexes act excessively to emo-

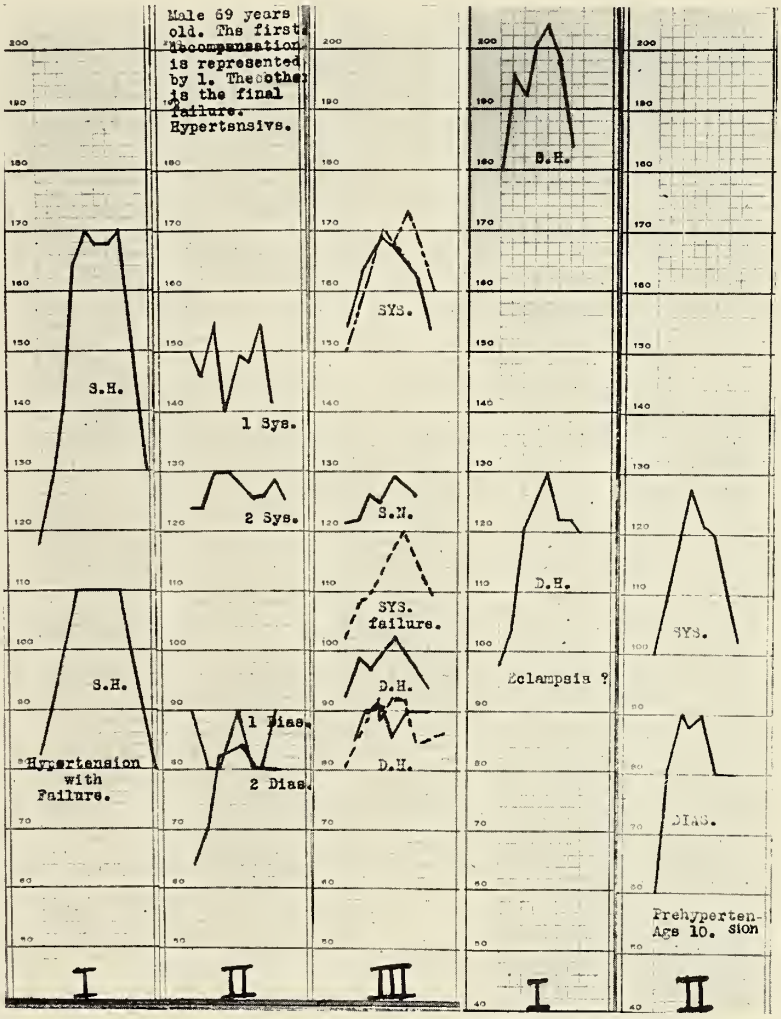


Fig. 4 *(left)*. Graph I. Lower curve represents response of patient in cardiac decompensation. Response is within normal limits but hypertensive in character. Upper curve represents the response after return of compensation.
Graph II. Curve 1 represents stage of decompensation while curve 2 indicates failure with patient in moribund state.
Graph III. Pressure response in three patients with cardiac decompensation.
Fig. 5 *(right)*. Graph I. Response of patient with eclampsia.
Graph II. Response of a ten year old boy supposedly prehypertensive.

tional and other stimuli, and it is possible that the vasoconstriction thus produced may persist after the stimulus is removed. Normally the blood pressure is proportional to the force and rate of the heart beat as well as the degree of peripheral resistance. When the hand is immersed in water at a temperature of 4° centigrade, it becomes red, indicating a dilatation of the minute vessels and a constriction of the arterioles. The number of arterioles constricted, however, in the local area is too small to produce the vasomotor responses in this experiment. Further, the continuous activity of the vasomotor center is necessary to increase peripheral resistance through constriction of the splanchnic and cutaneous arterioles. The stimulation of the proximal end of a severed sciatic nerve results in an elevation of blood pressure resulting in an increased supply of blood to the injured area. The stimulation by cold simulates this mechanism. In the instances of the sciatic stimulation, the rising pressure is produced by constriction of the splanchnic and other vessels, resulting in increased blood supply to the stimulated area. Likewise, it seems probable that the discomfort, pain, and local circulatory change produced by the stimulus of cold may result in a reflex stimulation of the vasomotor center, resulting in an increased circulation to the area stimulated. It seems probable that in the hypertensive individuals, because of the vasomotor irritability, the activity of the vasomotor center persists, giving us the characteristic type of response.

SUMMARY

1. The vasomotor response to the stimulus of cold was ascertained in 124 individuals. In addition, isolated responses of individuals suffering from various diseases were obtained. The number of cases studied is small, but in conjunction with the work by Hines and Brown, of Rochester, Minnesota, it seems that hypertensive individuals reveal an apparent specific type of response in both males and females. This response in the hypertensive patients is a more marked elevation of the systolic blood pressure, with a slower return to the basal pressure, resulting in a curve of the plateau type.

2. Normal individuals also have apparently a specific response, which is shown by both sexes, in a rapid rise and fall of the systolic pressure, producing a peak type of curve.

3. The diastolic changes were not uniform nor specific in their character.

4. The mechanism producing the response is apparently reflex in origin, bringing about a generalized vasoconstriction of the arterioles with an exaggeration of the response in individuals predisposed to hypertension.

5. One patient in the series gave a response that we feel might be construed as a prehypertensive type of curve.

6. A study of the response of the patients with syphilis of the central nervous system indicates a marked exaggeration, the cause of which is unknown, but may be the result of vascular changes produced by the disease.

7. The application of this test proved of value in determining the etiology of four cases of heart disease.

8. If further study indicates that these responses are specific in character, this test will be of great value not only in the determination of etiology of heart disease, but in the recognition of those individuals who have latent or prehypertension and are poor life insurance risks.

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PROCTOSCOPIC DIAGNOSIS OF CHRONIC ULCERATIVE COLITIS*

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Minneapolis

SINCE the original publication in 1924 by Bargen, of his work in identifying the diplostreptococcus and its relationship to the pathologic picture in chronic ulcerative colitis, much attention has been focused on this disease. Emphasis has been placed almost entirely, however, upon the etiologic phase of the disease and its corollary, the rôle of specific vaccine therapy in the treatment of chronic ulcerative colitis. That such a disease entity exists is no longer questioned but the picture presented by the disease is familiar to only a limited number of men.

Much may be accomplished in the way of inducing remissions of the disease by early diagnosis, and cases presenting a restoration of haustra in the colon and something like normal lumen diameters will be seen more frequently as the result of treatment instituted early in the course of this ulcerative process. When the medical profession accepts the appearance of blood in the stool as a symptom calling for proctoscopic examination a long step will have been taken, for it is by proctoscopic examination only that most of the early cases may be diagnosed. Certain underlying facts in the pathogenesis of chronic ulcerative colitis make it very difficult or altogether impossible to differentiate this disease by any other technic.

The inflammatory process starts low in the rectum almost invariably and ascends, as the disease becomes more chronic, into the upper rectum and colon. It is rare indeed that a case of chronic ulcerative colitis will manifest itself in a portion of the colon beyond vision through the proctoscope and leave the bowel and rectum below free of the disease. In a large series of proved cases of this disease, Bargen has shown that not more than 5 per cent of his cases were in colon segments not accessible to the proctoscope. In occasional early cases and in those which have started in the rectum and are of low virulence, the involvement will be limited to the rectum. Logan found that in a series of cases studied 20 per cent were limited to the rectum.

It is frequently impossible to detect any roentgen evidence of disease until it has ascended into bowel areas more readily visualized. Proctoscopic examination offers the only means of making an early diagnosis in such cases.

When it is realized that sigmoidoscopy offers a 95 per cent chance of making an early diagnosis, a knowledge of the picture in such a case becomes imperative. Chronic ulcerative colitis, early in its active phase, exhibits a diffuse hyperemia which, in accordance with the above stated tendency of the disease to start near the anus and ascend, will be seen to fade off gradually into normal mucosa. As the disease develops, the mucous membrane becomes edematous and traumatizes and bleeds very readily. A very easy and reliable means of bringing out this evidence is to gently stroke the mucous membrane with a cotton swab through the proctoscope. This slight trauma will cause bleeding in cases of chronic ulcerative colitis.

The ulcerating character of the mucosa develops through the formation of myriads of miliary minute superficial abscesses which rupture easily, leaving a pin point sized ulcer. No large ulcers will be seen early in the course of the disease and it must be recognized that these small ulcers spread diffusely over the mucosa and eventually produce the picture of the disease.

It is much more probable that one would see these early evidences of development were he to encounter the disease early in its course. As the disease becomes chronic, a new phase in the picture is met with: healing or remission is instituted and some scarring occurs. The scars appear here and there where the bases of the miliary ulcers had been and produce a glazed granular appearance of the mucosa. Others will exhibit a peculiar ground-glass appearance. The striking thing in the whole picture is the diffuseness, no normal appearing mucosa being found between the ulcers or indeed until the upper limits of involvement are reached, when the granular or ground-glass appearance fades off into normal mucosa.

As secondary infection occurs in the ulcerated mucosa larger ulcers may appear. These ulcers

*Read before the Hennepin County Medical Society, Minneapolis, April 13, 1932.

vary in size from a few millimeters to three or more centimeters, forming a ragged or irregularly outlined ulcer. It is not at all to be inferred that these latter lesions are the true picture of chronic ulcerative colitis, but rather that secondary infection having occurred the many miliary ulcers have merged together in this area. These larger secondary ulcers may confuse the examiner and lead to wrong diagnosis.

In the process of healing, scar tissue formation is such that two constant features are produced in the endoscopic picture. The valves of Houston are normally quite sharply edged while in chronic ulcerative colitis these sharp edges are ironed out into a rounded elevation in the rectal wall or in extreme cases may have disappeared entirely. As a result of the same process, namely, scar tissue contraction in the mucosa, submucosa and muscularis, thickening of the wall with a tube-like contraction will at times progress to a point where a lumen of only two or three centimeters is left. One may see occasionally a rectal or rectosigmoid stricture in association with chronic ulcerative colitis, where the deformity is caused by this contraction of the scar tissue in the wall of the rectum or sigmoid. This stricture is the end point of a process which to some degree is so constant that it may be looked upon as one of the diagnostic criteria of chronic ulcerative colitis.

Occasionally as scar tissue forms and contracts, many small islands of mucosa stand out on the surface of the bowel. In certain cases these may be so prominent in a remission period as to cause a diagnosis of multiple polyposis to be entertained. Closer examination, however, will reveal these many raised areas as mucosa pinched up into polypoid forms by the scar tissue at their base.

The following two histories serve to point out the diagnostic value of the proctoscopic examination in rectal and colon lesions.

CASE REPORTS

Case 1.—A. S., white, an unmarried woman aged thirty-seven, gave a family and past history which was of no significance. The history of her present complaint was that, three weeks following an acute sore throat for which she did not consult a physician or stop her work as a saleswoman, she began to see moderate amounts of bright red blood in her stools. She had only two stools a day but these were quite soft and mushy. She had no rectal pain or protrusion although her complaint was that she was troubled by bleeding hemorrhoids.

The general physical examination revealed nothing of direct importance. Her throat appeared normal and a rectal digital examination was negative. Her hemoglobin, leukocytes and urine were considered satisfactory. Fluoroscopy following a barium enema was reported "colon negative." At proctoscopic examination there was found an active chronic ulcerative colitis limited to the lower two-thirds of the rectum. The mucosa was thick, spongy and edematous with diffuse pin point sized ulcers throughout the involved area. The mucosa bled readily when touched with cotton. There was no contraction of the rectum and the valves of Houston were not rounded.

Case 2.—H. R., a white female aged twenty-three, gave a history that in the fall of 1929 she had had an attack of what was called by her physician intestinal influenza. She had complained of some cramping pain in her pelvis and had noticed this usually brought on a bowel movement which usually was thin and contained bright red blood. Her stools had numbered from five to eight each twenty-four hours. This attack had lasted three weeks when her stools had returned to two a day and appeared normal. She had had two similar attacks before the onset of her present one, which is of two months duration. She thinks eating food with much roughage brings on the attack. She has lost five pounds in weight since the onset of her trouble.

Her physical examination revealed tenderness low in the pelvic midline. She was somewhat anemic in appearance and poorly nourished. Her hemoglobin was 58 per cent (Dare), red blood cells 3,620,000 and leukocytes 7,860. Stool examination shows gross blood, many pus cells but no parasite nor ova. Colon fluoroscopy was reported normal. Proctoscopic examination showed a chronic ulcerative colitis with the upper border of involvement just below the recto-sigmoid junction. The mucosa was granular and showed diffuse miliary ulceration. There was slight contraction of the bowel lumen.

Direct examination of the lumen and mucosa of the rectum and bowel enable a diagnosis of ulcerative colitis to be made earlier than any other method, and a truer idea of how the diseased tissue appears may thus be obtained. Colon fluoroscopy is of value chiefly in determining the proximal extent of the disease and checking the colon above the range of the proctoscope for additional involvement from polyps, carcinoma or stricture.

In a paper as limited as this it is not possible to include the differential diagnostic points between ulcerations due to ameba histolytica, tuberculosis, poisoning by the heavy metals, trauma, and the few additional diseases which may

produce ulcerating lesions in the rectum or colon. Suffice it to say that these lesions are rare while chronic ulcerative colitis is relatively common and that the appearance of the mucosa as it is described above is not easily confused with ulcerations due to any other known disease.

SUMMARY

It has been well shown that chronic ulcerative colitis is a definite disease entity.

Early diagnosis of this disease will effect a great increase in remissions.

Proctoscopic examination offers the examiner approximately a ninety-five per cent chance of making the diagnosis early.

Proctoscopic examination is urged in all patients complaining of bleeding per rectum or persistent diarrhea.

The significant features of the sigmoidoscopic picture of chronic ulcerative colitis are: (1) glazed granular mucosa which bleeds easily when only slightly traumatized; (2) tubular contraction and thickening of the bowel and rectum; (3) ironed out or rounded appearance of the valves of Houston.

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PREPARING PATIENTS FOR OPERATION ON THE PROSTATE GLAND*

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ONCE the outflow of urine from the bladder has become obstructed as a result of gradual enlargement of the prostate gland, there are set in motion forces in the urinary tract which in their effort to overcome this barrier result in lasting injury to the entire urinary system. If the condition is left uncorrected, death may finally result.

These efforts by the musculature of the bladder to overcome urethral obstruction, and to force the urine past the increasing barrier of prostatic tissue, result first in irregularity of the previously even surface of the bladder, producing coarse trabeculation that is characteristic of the disease. If relief is not given, these trabeculations become larger and the interstices between them develop into pouches known as cellules, which, over an extended period of time, rapidly develop into diverticula. In extreme cases the diverticula may reach the size of the bladder itself. Since these diverticula are without muscular coat, they are often incapable of emptying, so there is always present a goodly amount of stale, infected urine, often of foul odor, which will prevent any possibility of relieving the bladder of infection until the diverticulum is removed. Therefore, to the gravity of an operation for removal of the prostate gland is added the further risk of diverticulectomy before complete relief of symptoms is obtainable. Such a combination of operations is frequently more than patients of advanced age can stand, and yet to do the one without the other is to afford but little aid to the patient, unless, by happy circumstance, the diverticulum empties with the bladder, in which case there is no need for its surgical treatment.

Consequently, when preparing patients for operation, it is of first importance to ascertain how great an amount of structural injury has occurred. This is best ascertained by the cystogram, taking the roentgenograms with the bladder full, and the roentgen tube so placed as to project the

*From the Section on Urology, The Mayo Clinic, Rochester, Minnesota. Read before the Fourth Congress of the Panamerican Medical Association, Dallas, Texas, March 21 to 25, 1933.

shadow of the diverticulum beyond the shadow of the bladder. These roentgenograms should be followed by one taken after the bladder has been emptied, to ascertain whether, if a diverticulum is present, it has emptied. Such cystograms show the bladder, in cases of prostatic obstruction of not long standing, usually to be pyramidal in shape, a deformity which the bladder assumes in its endeavor to force the urine past the obstruction. If the obstruction is of longer duration, the deformity is more irregular, and cellules and diverticula occur more frequently. These cystograms, besides giving valuable information regarding diverticula, also safeguard against the possibility of the symptoms produced by a cord bladder being mistaken for those of prostatic hypertrophy. The tabetic bladder, or bladder that is paralyzed by disease of the spinal cord, never assumes the pyramidal contour that comes with urinary obstruction, but remains spherical, and if trabeculations occur they are of much finer texture. If a roentgenogram has been made of the urinary tract before the cystograms are made, in order to exclude the presence of calculus, and if rectal palpation demonstrates an hypertrophied gland, there is no necessity for cystoscopic examination; the significant symptom, the characteristic cystogram, and the enlarged gland are sufficient information with which to make the diagnosis. Cystoscopic examination may complicate the surgical treatment by producing an unnecessary reaction, for a urethra deformed by prostatic enlargement will not well tolerate the passage of rigid instruments.

Having ascertained the anatomic changes produced by the disease, it is next important to discover if possible what are the physiologic changes that have developed, for urinary obstruction is invariably associated with more or less renal impairment, depending on the extent and duration of the obstruction. Thus, slight prostatic hypertrophy, with but 10 or 15 c.c. of residual urine, will cause such slight renal impairment as to be almost undemonstrable, whereas many hundred cubic centimeters of residual urine are usually associated with an injured renal mechanism, resulting in retention of many milligrams of urea, and the almost complete absence of excretion of phenolsulphonphthalein or methylene blue.

Obviously, preoperative care in the presence of these two extremes is very different. The patient with a small amount of residual urine, and without serious infection of the prostate gland or bladder can be operated on safely, without preliminary preparation, whereas the patient who shows unmistakable signs of associated renal injury may require many weeks of the most careful and painstaking care. Efforts must be directed toward elimination of the retained toxic substances, as estimated by the urea content of the blood, together with every effort to improve renal function. Elimination is helped by application of a hot pack to induce sweating; before the patient is placed in such a hot pack the administration of pilocarpine hydrochloride grain 1/10 (0.006 gm.) given subcutaneously and acetylsalicylic acid grains 10 (0.65 gm.) given by mouth will be found to be of much assistance. Before the patient is subjected to elimination of fluids through the skin, the fluids should be available in the body; therefore, in extreme cases it is advisable to administer into the vein 2,000 c.c. of physiologic solution of sodium chloride prior to induction of sweating. The intravenous injection should be repeated at least in six hours if the retention of urea is extreme, whereas, if the value for urea is not too greatly elevated, 1,500 c.c. daily usually will be sufficient. However, until the value for urea in the blood has returned to normal, it is well to try to keep the output of urine as high as 3,000 c.c. daily. The necessity for fecal elimination need hardly be emphasized, except to observe that saline cathartics are the best in these cases, for they help increase the elimination of fluid, and so permit of ingestion of more fluid, which is a condition most to be desired under the circumstances. Taking of water and other fluids by mouth is to be pressed to the patient's easy tolerance, for it has been demonstrated, both clinically and experimentally, that ingestion of too much water can produce definite toxic effects. Therefore, forced administration of fluids should be by way of the venous system, and the fluid should be physiologic solution of sodium chloride; then toxic effects are not to be anticipated.

In order to increase elimination of toxic material by enormous increase in the output of urine, the prostatic obstruction must be overcome for the time being. To effect this, one has the choice of three methods. First, a catheter may be passed every few hours, and all residual urine removed. However, frequent passage of a catheter through a urethra already rendered abnormal

by prostatic changes is seldom possible without discomfort or irritation. This regimen, also, does not permit of constant, unobstructed flow of urine, a most important consideration if elimination is to be maximal. Second, a catheter may be placed in the urethra and allowed to remain for several days. In the majority of cases this is the preferable means of establishing uninterrupted outflow of urine, especially in cases in which retention and toxicity are slight and the period of preparation will not be prolonged. Third, a suprapubic drainage may be made, and the urine continuously collected. This method is superior to the other two, for it does not necessitate wearing a catheter in the prostatic urethra, which is already congested and deformed by hypertrophy of the prostate gland. Of so decided benefit is this method, that in a few weeks the gland will shrink markedly. In the more serious cases it is the procedure of choice, for once drainage by this method has been established it can be indefinitely prolonged without risk, and preparation for ultimate operation can be extended over a period of months, or even years. In the last few years approximately 25 per cent of the patients operated on at The Mayo Clinic for prostatic obstruction have been prepared for operation by this method. However, since the transurethral method of treatment has replaced prostatectomy, this percentage has dropped, for the risk of transurethral resection is so little as compared with prostatectomy that one feels justified in undertaking the operation in many cases in which prostatectomy would be contraindicated. In 1932, of 276 patients operated on by this method, forty-eight (17.39 per cent) had previously undergone suprapubic cystostomy. For these forty-eight patients, therefore, transurethral resection was the second stage of an operation performed in two stages. The postoperative course, when two stages are necessary, is longer than when transurethral resection can be performed at once. Healing of a suprapubic sinus takes time, whereas, the majority of the patients treated by transurethral resection only, leave the hospital on the fifth, sixth, or seventh day after operation. When large amounts of tissue require removal through the urethra, the risk of postoperative complications is less if a suprapubic drain is in place.

When there is no appreciable urinary infection, and renal function has been injured little or none as a result of the prostatic hypertrophy, then there is no occasion to drain the bladder before operation. If such drainage is undertaken, there frequently will occur a febrile reaction on approximately the fifth to the seventh day thereafter; the reaction lasts several days, during which the patient loses his appetite, feels dull, and often constitutes a much poorer surgical risk than before. Cabot and Meland have recently shown that if renal function is determined by excretion of phenolsulphonphthalein, before and after such an attack, it will be found to have diminished after the attack. I therefore never hesitate to perform transurethral resection, once the diagnosis is made, providing renal function is within normal limits and infection is not severe. Delay, and institution of urethral drainage, seem to favor development of postoperative infection, if it has been absent before. The indwelling catheter irritates the prostatic urethra. It may render acute an infection which has been chronic, and when an acute infection is produced in the presence of residual urine, serious complications are likely to occur.

If, because of infection or impaired renal function, urethral drainage is deemed necessary for a time, it is best to perform bilateral vasectomy, thus guarding against epididymitis. This complication can prove most serious, and may lessen chances of recovery of a seriously debilitated patient. Vasectomy is easily performed, and absolutely insures the patient against such an eventuality.

Recent work by Clark and Helmholz has demonstrated that the best insurance against urinary infection is to render the urine highly acid by means of drugs, for the organism most frequently encountered is the colon bacillus. This organism multiplies only with difficulty if the acidity of the urine is high; if the pH falls below 5.4, such infection seldom can persist. This extreme acidity usually can be produced by administration of ammonium nitrate, grains 15 (1 gm.) given three times a day in enteric coated capsules. If the medication includes methenamine, complete sterility of urine before operation usually can be obtained. When this is not possible, prescribing of a ketogenic diet for a week before operation seldom will fail to result in sterile urine. Such a diet is high in fat, and the ketone bodies produced by it have marked germicidal value in addition to that resulting from the acidity which it

produces. The presence of ketonuria can readily be tested, for when a small amount of ferric chloride is added to the urine the mixture takes on a reddish brown color if ketonuria has occurred.

Following a preoperative procedure such as has been outlined in this presentation, in 1932 at The Mayo Clinic operations by the transurethral method were performed in the 276 cases of prostatic obstruction that have been mentioned; there was not a death. In the last six years, 499 such operations have been performed at The Mayo Clinic by this method, with but seven deaths, a mortality of 1.4 per cent.

INTERMITTENT ATTACKS OF FEVER RESULTING FROM PARTIAL BRONCHIAL OBSTRUCTION WITH MINIMAL PULMONARY SYMPTOMS*

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ANY factor which interferes with normal drainage of the tracheobronchial tree will eventually produce suppurative pulmonary disease. The condition may be caused by foreign body, neoplasm, inflammatory reaction or any abnormality that reduces the lumen of the trachea or bronchi. In most instances, the local manifestations in the lung produce the usual symptoms of pulmonary disease, such as cough, expectoration, pleurisy and hemoptysis. Constitutional reactions are taken for granted, and are attributed correctly to absorption from suppurative foci in the bronchi or parenchymal tissues of the lung.

The existence of malignant disease in the bronchi without clinical signs and symptoms and the absence of the usual roentgenoscopic data have been noted by various authors, especially Parker, who called attention to the presence of metastasis of these tumors to the cerebrum in cases in which the primary growth was not recognized until necropsy was performed. That partial stenosis of a bronchus can exist and produce marked constitutional symptoms from suppurative processes in the lung, with mild pulmonary manifestations, is not generally known, and we are reporting three illustrative cases to emphasize the necessity for considering pulmonary suppurative disease in the presence of intermittent chills and fever.

Case 1.—A man, aged sixty years, was examined in The Mayo Clinic March 2, 1931. He stated that he had contracted malaria in childhood, and that for forty years he had experienced chills followed by fever of 102° to 103° F., lasting a day at a time. At first, these episodes were noted about once every six months and were precipitated by over-exertion. Eight years after the onset of symptoms, he was thought to have typhoid fever, and following this illness he "caught cold," and daily fever, loss of weight, bloody sputum and the organisms of tuberculosis in the sputum were noted. In four months most of his symptoms subsided, but he continued to have slight cough with an occasional streak of blood in a small amount of sputum. In the two years preceding his examination, he had had attacks of chills, fever and prostration once every week, but this was not associated with any alteration in the amount of cough or expectoration. He also had mild digestive symptoms that were attributed to disease in the gallbladder, and roentgenoscopic examination of this organ revealed the presence of a large gallstone. It did not seem likely that this was the cause of the intermittent febrile attacks.

Clinical and roentgenologic examination of the thorax did not reveal significant data. Smears of the blood were negative for malaria and the leukocytes were within normal limits. The sputum did not contain bacilli of tuberculosis. March 7 the temperature was 100.2° F. and reëxamination of the thorax revealed diminution of breath sounds at the posterior base of the right lung, associated with considerable moisture over the same area. Bronchoscopic examination was made two days later and a stricture was found in the mesial division of the bronchus to the lower lobe of the right lung. This was dilated and aspirated. The patient remained free from symptoms for a little more than three months, when he had another chill with fever, and an increase in sputum with some odor to the

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breath. Further bronchoscopic aspiration was done June 22. The patient was free from symptoms until August 21, when he again noted a slight chill with fever following severe exertion. Before this attack the breath was foul. At the time of the last report, February 22, 1932, the patient had been in good health.

Case 2.—A man, aged fifty-five years, came for examination because of recurring attacks of chills and fever for thirty-nine years. The onset of disability had begun following pneumonia. He did not recall whether the attacks were associated with pulmonary symptoms during the first nine years, but for thirty years they had been accompanied by cough and the expectoration of non-odorous mucopurulent material which was sometimes pink. For ten years the episodes would occur about three or four times a year, but for twenty years they occurred on an average of once a month, and were precipitated by overwork, worry and overeating. At the beginning of an attack, the hands felt dry; drowsiness and a severe chill would be followed by fever as high as 104° F. Then cough began with sputum as described. Recovery was complete in two or three days. There were no pulmonary symptoms between the attacks. A bronchoscopic examination had been made three years before the patient came to the clinic, but apparently nothing had been done and the patient continued as before.

At the time of examination, the patient weighed 129 pounds. He appeared poorly nourished, as his height was 5 feet, 9¼ inches. He had experienced a chill one week previously and the temperature was still 101.4° F. Leukocytes numbered 7,000 in each cubic millimeter. The sputum did not reveal the organisms of tuberculosis. Examination of the thorax was essentially negative. Roentgenoscopic examination revealed some thickening of the pleura at the base of the right lung. On bronchoscopic examination a small amount of pus was found exuding from the bronchus to the lower lobe of the right lung. The lumina of several bronchi were narrowed, but a true stricture was not identified. The bronchi were thoroughly dilated and aspirated.

In May, 1931, the patient returned for examination because of discomfort in the region of the left kidney. He had had only two or three mild chills with fever since the bronchoscopic treatment and had gained 16 pounds. Roentgenoscopic examination of the thorax was reported to be negative, and the bronchoscope revealed a small amount of pus in the bronchus to the middle lobe of the right lung. The bronchi were again dilated. In October, 1932, the patient reported that he was in excellent health.

Case 3.—A man, aged twenty-six years, came for examination December 5, 1932, because of recurring chills and fever for three or four years. The attacks came late in the afternoon, recurring about three or four times a year and were ushered in with a chill. This was followed by fever to 104° F., a mild, hacking nonproductive cough, great prostration and mild delirium. The following morning the temperature would be normal, and if the patient remained in bed the attack would terminate without further distress. If he got out of bed, the fever and chills would recur in the afternoon for three or four days. The last attack had been Monday, November 28, and the fever had continued until Friday, December 2.

The patient was well developed and well nourished, weighing 162 pounds. The leukocytes numbered 6,200 and the examination of sputum was negative for bacilli of tuberculosis. Examination of the thorax revealed an area of bronchiectasis at the base of the left lung behind the heart, with evidence of partial bronchial obstruction. Roentgenograms of the thorax showed nothing abnormal. The bronchoscope disclosed that a posterior division of the lower portion of the left main bronchus was partially stenosed and exuded purulent secretion. The stricture was dilated thoroughly and aspirated. February 5, 1933, a letter from the patient gave the information that he had remained perfectly well.

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CHARITY

The hardest lesson of all to learn is that the law of the higher life is only fulfilled by love, *i.e.*, charity. Many a physician whose work is in a daily round of beneficence will say hard things and think hard things of a colleague. No sin will so easily beset you as uncharitableness towards your brother practitioner. So strong is the personal element in the practice of medicine, and so many are the wagging tongues in every parish, that evil-speaking, lying, and slandering find a shining mark in the lapses and mistakes which are inevitable in our work. There is no reason for discord and disagreement, and the only way to avoid trouble is to have two plain rules. From the day you begin practice never under any circumstances listen to a tale told to the detriment of a brother practitioner. And when any dispute or trouble does arise, go frankly, ere sunset, and talk the matter over, in which way you may gain a brother and a friend. Very easy to carry out, you may think! Far from it; there is no harder battle to fight. Theoretically there seems to be no difficulty, but when the concrete wound is rankling, and after Mrs. Jones has rubbed it in with cayenne pepper by declaring that Dr. J. told her in confidence of your shocking bungling, your attitude of mind is that you would rather see him in purgatory than make advances towards reconciliation. Wait until the day of your trial comes and then remember my words.—Counsels and Ideals from the Writings of William Osler.

President's Letter

DURING the next few months, large numbers of young people will determine on which business or professional career they will prepare themselves for at the University. Undoubtedly many of them, contemplating the study of medicine, will consult the family physician, and no more kindly advice could be given a young man or woman aspiring to the practice of medicine as a career than to point out the already overcrowded condition of the profession..

It is our duty to these young people who may depend upon us for advice, and it is our duty to the profession itself, and to the public, to discourage young people from embarking upon a professional career in a field which is far from being able to support the number of highly trained people already depending upon it for a livelihood.

Yours truly,



President,
Minnesota State Medical Association.

EDITORIAL

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OUR EIGHTIETH ANNUAL MEETING

Great annual meetings are becoming a habit with the Minnesota State Medical Association. It may be said with due modesty, after the 80th annual gathering at Rochester in May, that the Minnesota meeting takes on the character of the interstate assembly which it may become in years to come.

The Rochester meeting presented so much of surpassing interest that no medical man in this part of the world could afford to miss it—and few did. The registration broke all previous records and it included a surprising number of physicians from neighboring states.

It is difficult, even at this date, to set down briefly the high lights, scientifically, of the extremely varied three-day program. Some 200 men took part in the sessions, many of them of international note in their specialties.

For a good many, the small group demonstrations, developed and emphasized at this meeting following their inauguration in St. Paul a year ago, were the most valuable events of the program. The exhibit halls in St. Mary's Nurses' Home offered a bewildering variety of these demonstrations and intimate lectures during demonstration hours each day. Half a dozen small rooms along the corridors connecting the halls were crowded to the doors. Radium treatment with A. U. Desjardins lecturing; methods of anesthesia with J. S. Lundy demonstrating; the treatment of rectal disorders with L. A. Buie, demonstrating; the physiotherapy demonstration, to mention only a few, were major attractions of the year. The exhibits, often neglected for more dramatic entertainment, also became a major feature of the meeting.

The daily clinics of the Mayo Clinic and the afternoon of programmed clinics drew a surprisingly large group of visitors also, it is interesting to note.

Naturally, a state meeting of the scope of Minnesota's annual medical event holds more than a purely scientific interest for the medical man. It provides his annual opportunity to re-define his position socially and economically as citizen and doctor. The current public interest in the problems of care of the sick and reduction of medical costs, and the great practical difficulties confronting the doctor himself, made the economic and sociological sessions of greater than ordinary interest to the average practitioner. This interest was witnessed by the huge crowds that gathered Monday and Tuesday night at the Methodist Church. The committee in charge of the program for these events are to be congratulated on their happy choice of speakers for both nights.

Morris Fishbein, C. H. Mayo, W. J. Mayo,

Dean Lewis, to mention only a few of the distinguished medical speakers, bear potent names. They call for respectful hearing from men of all classes and professions and they speak authoritatively when it comes to the question of shaping medical aims and policies in the United States. The stirring talk of the one non-medical speaker was perhaps the high light for many on those notable programs. This talk was made by Archbishop John Gregory Murray and probably left no one who heard it unmoved by the high obligation laid upon the doctor in these times, as this distinguished clergyman saw it.

Reflecting the obvious interest of the profession in general in these matters, the House of Delegates took action in some form on an important and varied order of business that touched in some fashion on most of the great problems of the day. Medical care of the poor, formulation of principles with regard to contract practice, to medical relations with insurance companies, to public education, to the disproportionate increase in professional men, particularly physicians, provoked thoughtful discussion, also a notable absence of precipitate and unconsidered action which reacts to the credit of the entire profession in Minnesota.

The profession is deeply indebted to its hosts, the Olmsted-Houston-Fillmore County Medical Society, for the hospitality shown it during the three days. The Mayo Clinic and St. Mary's Hospital, especially, put every splendid facility at the disposal of the meeting and contributed immeasurably to its success. No comment on the meeting could be complete, either, without mention of the pleasant social affairs arranged for the doctors and their wives.

It is worth mentioning that this meeting, due to careful planning in advance and to energetic sale of exhibit space, was the least expensive held by the state society in many years, a fact which takes on a special significance in view of the interest and variety of the program and the excellence of meeting accommodations.

THE CANCER SURVEY IN MINNESOTA

It is always well in planning a campaign to know not only your own resources but as much about the enemy as possible. This was the idea that prompted the survey of the cancer situation in Minnesota last year by Dr. Frank Leslie Rector of the American Society for the Control of Cancer. Incidentally, the survey was made with the approval of the Council of our State Association, the Minnesota Hospital Association and the State Board of Health, and received the coöperation of various additional agencies such as the departments of health and Visiting Nurses organizations in the Twin Cities.

The report is most complete, contains a critical appraisal of the forces available in fighting cancer in our state and makes numerous recommendations.

The death rate from cancer in Minnesota has shown a steady and marked increase during the past twenty years. It is greater than that for the country at large, part of which is explained by the fact that out-of-state patients come to the Mayo Clinic and the Twin Cities for treatment. The increase in mortality in general is an actual increase, however, and not explained by better diagnosis or the increase in the percentage of the population now in the cancer age.

The cancer situation, therefore, presents a serious problem which is likely to become even more serious in the near future. The problem is primarily a medical problem, and it behooves the medical profession to exert its utmost energy to do everything possible to combat it. Are we as a profession doing all that can be done? While the survey gives a very fair appraisal of the good work that is being done by the Cancer Institute at the University, the Mayo Clinic and some of the larger hospitals, in the diagnosis and treatment of cancer, from the standpoint of the minimum requirements established by the American College of Surgeons for a proper cancer service at a general hospital, all of the hospitals in Minnesota fail to measure up to the standard. A few additions here and there would enable many of the larger hospitals to meet this standard. Some hospitals lack the required x-ray equipment, some a sufficient amount of radium, some the facilities for pathological diagnosis, and most of them the important follow-up of cancer patients necessary for evaluation of treatment given.

One of the recommendations made in the survey is that all general hospitals in the state caring for cancer patients that can meet the minimum requirements of the College, do so. It is admitted that it is impractical for the smaller hospitals that receive only a few cancer patients a year to attempt this, but that they refer their

patients with cancer, or suspected of having cancer, for diagnosis and treatment to institutions meeting requirements.

All the recommendations submitted by the survey are of value but we wonder whether they can all be carried out. The recommendation is made that the Cancer Institute at the University add another deep x-ray therapy machine and increase the radium in its possession to 1,000 mg. With the city hospitals in the Twin Cities and patients from all over the state being referred for treatment to the Cancer Institute there is doubtless the need for the Institute to expand.

The Institute should, of course, be used as much as possible for both undergraduate and postgraduate instruction in cancer, particularly in the interest of early diagnosis.

The survey also recommends the establishment of special record systems in hospitals, the use of the College of Surgeons' form, and the follow-up of patients by social workers under the supervision of a cancer committee of the staff.

Our State Medical Association should doubtless have its cancer committee. We will leave it to the Department of Pathology at the University whether it wants to establish a tumor registry and add more tissues to its collections. If provision is made for the study of such specimens —well and good.

We are not in a position to discuss the recommendation of the establishment of a Division of Cancer Control in the State Department of Health. Until we know what causes cancer, it is going to be difficult to control. Until such time, control must rely on early consultation, early diagnosis and thus early treatment.

The survey as a whole emphasizes the need for coöperation of medical and lay forces in the cancer fight. Continuous publicity regarding the need of early consultation for suspicious symptoms and the necessity of early diagnosis on the part of physicians are both essential to assure the early use of our limited but valuable therapeutic measures.

MEDICINE AND THE PUBLIC WEAL

The political ferment is working under enormous pressure. The spectacle of a Washington Administration groping to maintain the status quo so suddenly shifting to one of novelty enthroned is not so much the recipient of fear as of awe. Let it be added that reverence is not yet attained but a hopeful people are not at all displeased with the prospect. These events have (temporarily at least) wafted away much of the heated atmosphere that developed soon after the Medical Cost Commission made its report. In this lull (and while we witness securities vendors, bankers and industrialists reaching out with avidity to accept the yoke) it behooves those of us engaged in medical practice to keep our heads and quietly demonstrate that our guild kept a soulful purpose clearly in view through all this financial travail. We have not deserted our job; few people indeed have been medically neglected.

Too large a percentage of the population, in this unemployment, may have been drawn out of the panels of private practice. But often in charity clinics they have kept contact with their former doctors. There has been little recrimination, despite the fact that often the doctor was as flat as the patient.

It is no time to make comparisons, but one at least cannot fail to escape: If our erstwhile financial geniuses had received in the last ten years the same quality of medical attention that they gave us as financial advisers—well, their ranks would have suffered a depletion something commensurate with our savings. However, perish this unhappy thought! The point at issue now rests with the circumstance that the Government will soon be directing (or owning) so many of our agencies of production and commerce it may be willing to let us continue a service that in the form of a guild was long ago adapted (far out of proportion to most other services) to the public weal.

E. L. T.

INTRAVENOUS UROGRAPHY

The new procedure of intravenous urography has brought out considerable discussion, pro and con, as to its real value in the armamentarium of the diagnostic clinic. Intravenous urography is the injection of a preparation into the veins, that is rapidly excreted by the kidneys. Many of these substances are on the market but the conclusions here recorded are based chiefly upon experience with skiodan. Anyone, with a well-developed vein technic, should be able to use it satisfactorily, and in the five years that the writer

has used it, there have been no severe reactions. The only conceivable contraindication to its use is marked impairment of the function of the cardio-renal systems. This procedure should be considered only as an adjunct to a cystoscopic examination, not to replace such an examination. Only when a perfectly normal response is obtained of both kidneys should it be accepted as final. If an abnormal response is found, this should be checked by a cystoscopic examination (if possible) including pyelograms, cultures, microscopic, and functional analyses.

The largest field for this examination is in patients where a cystoscopic examination is impossible or impractical. Where a stricture of the ureter exists, where acute infections are present in the urethra and prostate, and where there is marked enlargement of the prostate gland, intravenous urography should be resorted to.

Whenever a cystoscopic examination has been made and all attempts at catheterization of either or both of the ureters has failed, the intravenous method should be tried. It is very likely that it will demonstrate the reasons for this failure. Patients with severe pelvic or abdominal injuries present quite a problem to the urologist because of severe pain produced by motion of the lower extremities and by handling the patient. The intravenous route should be tried in these cases because a ruptured kidney, cut ureter, or ruptured urinary bladder can be very definitely diagnosed by this method. Much information can be obtained in both acute and chronic renal colic, both as to the function of the involved kidney and as to the amount of damage to the kidney tissue.

It is the opinion of the writer that this procedure should be included in the curriculum of every hospital, but with the note of warning that too much should not be expected of it. If it is carefully done, and the information that it gives is correctly interpreted, more correct diagnoses of urinary disease will be made.

G. T. Nordin, M.D.

THE CHICAGO EXPOSITION

Comparisons are odious. The Century of Progress Exposition at Chicago is different from the Columbian Exposition of forty years ago. Instead of the former classic architecture the present exposition is modernistic in effect, with a blending of color and a utilization of a display of illumination which is magnificent.

The layout of the display has been well planned. Special buses transport the visitors from one end of the three and one-half mile extent of the grounds to the other, not interfering with pedestrians. The radio and loud speaker are much in evidence. The two steel towers over six hundred feet in height enable the visitor to obtain a beautiful bird's-eye view of the exposition grounds, the city, and the lake.

The fair has its midway of amusements, its commercial exhibits, of which the General Motor assembly plant is, perhaps, the outstanding one, and its scientific exhibits, which are the most interesting. The medical exhibits are housed in the Science building and possess an attraction to the medical man, although prepared for their appeal to the public, primarily. The exhibits of the Wellcome Research Institute, the Cleveland Clinic, and the Mayo Foundation, and the numerous displays of the pharmaceutical houses are of special interest to the medical man. The transparent illuminated man, made in Dresden and now owned by the Mayo Foundation, attracts considerable lay interest.

We can but admire the audacity of those responsible for the fair, in their perseverance in the project in spite of the times. Whether the fair proves a financial success or not, it is bound to prove a stimulus to those who attend.

CONVALESCENT SERUM IN THE TREATMENT OF POLIOMYELITIS

The status of the treatment of preparalytic cases of acute poliomyelitis seems to require clarification. Although prevailing clinical opinions as to the efficiency of the treatment have been optimistic, few investigations have been adequately controlled. In two recent reports of controlled therapeutic tests, the evidence provided is not encouraging. Kramer, Aycock, Solomon and Thenebe record eighty-two cases about equally divided between those who received convalescent serum and those who did not. The Boston investigators concluded that their study offered no statistical evidence that convalescent serum is effective. Together with members of the poliomyelitis committee of the New York Academy of Medicine and his associates in the municipal hospitals, Park studied a total of 927 preparalytic cases of poliomyelitis, 519 of which were treated with convalescent serum; 408 patients were not given serum. The result of this study likewise does not afford statistical proof that the use of serum has any value in cases in which the cells of the central nervous system are already involved. The fact that the two controlled therapeutic tests gave similar results suggests that, heretofore, too much confidence has been placed in the treatment with convalescent serum. The need now is for additional evidence based on controlled studies which take into account the variants that make the problem complex. (Jour. A. M. A., October 8, 1932, p. 1266.)

« A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION »

ONE of the greatest problems before the physician, upon whom modern conditions have thrust the task of public health education, is involved in a proper lay understanding of his aim and function in this matter.

Unfortunately, public health education is not simply a matter of formulation in popular language of urgent truths which must then be submitted in proper form to newspapers, radios and public speakers. If in so doing, the doctor does not succeed in appearing as a disinterested teacher, purely, and not as a peddler of wares, then his teaching is likely to fail of its mark.

In the minds of the physicians themselves, and probably in the minds of the majority of intelligent laymen, the doctor is merely acting as one human being who warns another of danger. He is simply discharging his duty as a conscientious, responsible person when he warns, for instance, of the dangers of self-treatment with patent cures for cancer, epilepsy or diabetes. The pitiful tragedies that result, as well as the shocking waste of money involved, are known to every physician. The physician is in the position, actually, of one who would—or would not—warn the oncoming engine, of a broken rail. Cetrainly, he would not hesitate to raise the warning signal. The Public Health Education Committee has acted comparably in sounding occasional warnings through its news service about the patent remedy evil.

In the minds of a surprising number of otherwise intelligent and conscientious lay persons, however, the doctor who points out this evil—and the facts he cites may be verified at any medical school in the land—is accused of having a competing commodity to sell. He is regarded as a very inferior sort of merchant who is attempting to sell his stuff, like any pill maker, without paying his way.

This contention, which has come up again recently following publication of the first bulletin in some months relative to proprietary and fake cures, brings up once more the whole subject of advertising by physicians, a subject which has received considerable attention in the last few years from organized medicine. If the physicians have not, as a body, particularly in Minnesota, seen fit as yet to enter into advertising competition with the patent remedy makers, it is not because they hope, instead, to defraud publishers of newspapers or owners of radio stations.

There are graver considerations involved having to do with the welfare of the whole public, why the medical profession should hesitate to claim superior cures on the same terms as Lydia E. Pinkham, for example.

No individual physician or group of physicians has any special claim to the medical knowledge accumulated through the centuries. This fund of knowledge with all its special skills has lengthened the span of human life by many years. It has saved immeasurable human suffering. And it could save immeasurably more if men would call on it more. If its possibilities are only partially realized, the fault lies largely in the ignorance and inadequate education in these matters of the public at large.

One wonders if it is not the responsibility of the press, as well as of the medical profession and the teaching professions and the church, to spread public knowledge of the most important facts in the world? If the newspaper editor were medically trained, the physician would gladly turn over to him the part of his task having to do with the public press. Failing that, the physician has seen no other way but to try, however inadequately, to do the work himself. It is not with him, a question of barter and sale, of profit here or cheating there. Instead he regards it as a mission laid upon him to save men from avoidable suffering and death.

The physician does not and would not charge the editor with pure commercialism in his stand. The editor undertakes many another cause without return for space of any kind. It is perhaps the doctor's failure that he does not always present the cause of public health urgently enough to enlist the editor as fellow crusader in the important business of saving lives.

OF GENERAL INTEREST

A recent communication from the secretary of the Northern Minnesota Medical Association states that an excellent program is in preparation for the meeting which is to be held at Willmar, Minnesota, September 8, 9, and 10, this year.

Dr. E. O. Giere of Minneapolis, chief of staff of Fairview Hospital, was honored recently by medical associates and other friends at a banquet on the fortieth anniversary of the year he began the practice of medicine. A bound volume containing the signatures of former patients was presented to Dr. Giere. He formerly practiced in Madison, Minn., Watertown, S. D., and Saint Paul before locating in Minneapolis.

Dr. Adolph Hanson of Faribault was awarded a gold medal at the meeting of the Minnesota State Medical Association in Rochester in May in recognition of his achievement in discovering the active principle of the parathyroid gland and the isolation of its hormone.

The medal which is annually presented by the Southern Minnesota Medical Association for the best individual scientific exhibit at the State meeting was given this year to Drs. Ellis and Rosendahl of the University of Minnesota for their exhibit on causes of hay fever in Minnesota.

An organization of surgeons to be known as the Ramsey County Surgical Society was recently consummated for the purpose of investigating, through experimentation on the lower animals, particularly the dog, the fundamental principles of surgical technic, and to promote the free discussion amongst its members of the newer advances in such technic. It is felt that through this experimental work the younger members of the Society will be given an unusual opportunity for research. Officers elected for the coming year are: President, Dr. H. A. Drechsler; vice president, Dr. F. W. Mayer; secretary, Dr. Gerald P. Dunne; treasurer, Dr. John H. Wallinga, all of Saint Paul.

Suitable ceremonies were held at the Northrop Memorial Auditorium, Minneapolis, on May 4, 1933, in recognition of those who had served the University of Minnesota in one capacity or another for a period of thirty years. In the rather formidable list of those honored appear the following well known physicians and surgeons: Drs. Arthur E. Benjamin, James T. Christison, Alexander R. Colvin, William H. Condit, Charles A. Erdmann, James S. Gilfillan, Thomas B. Hartzell, Jennings C. Litzenberg, Arthur T. Mann, Walter R. Ramsey, Harry P. Ritchie, John T. Rogers, John L. Rothrock, Samuel E. Sweitzer, Henry L. Ulrich, S. Marx White, and Franklin R. Wright.

Fellows and interns of the Minnesota General Hospital, who completed their terms of service on June 30, 1933, will leave shortly to take up new work in various fields.

Dr. Fred Exner, Fellow, will have charge of the X-ray Department of the Bellingham General Hospital in Bellingham, Washington.

Dr. Stuart Shimonek will take up his new duties as Resident of the Gillette State Hospital, St. Paul, on July 1.

Both Dr. Charles H. Mead, Fellow in Surgery, and Dr. Luther Fisher, Fellow in Medicine, will enter private practice, Dr. Mead in Duluth, and Dr. Fisher in Pensacola, Florida. Dr. Mead's office address in Duluth will be 1100 Medical Arts Building.

The plans of Dr. Emmet Kehoe, Fellow in Medicine, and Dr. Stanley Chunn, Fellow in Ophthalmology, are still indefinite.

Dr. Clayton Beecham, Surgery intern, has accepted a position as Resident in Obstetrics and Gynecology at Bell Memorial Hospital, University of Kansas, Kansas City, Kansas.

Dr. Louis Friedman will go to Europe early in the summer for further study.

Dr. George Hauser will enter Health Service in the University of Minnesota.

Dr. Robert Plant is to be a member of the staff of the St. Louis Maternity Hospital at St. Louis, Missouri, and Dr. Robert Cushing of the Rhode Island Hospital, Providence, R. I.

For three months Dr. Fred Jarvis will be connected with the Obstetrical Department of the Minneapolis General Hospital and will return to the Minnesota General Hospital at the end of that period.

Dr. James Tedder and Dr. Leo Wolfson have accepted Fellowships at the Minneapolis General Hospital, the former in the department of Dermatology and Syphilology.

Dr. Aileen Petri will serve for three months in the Bobs Roberts Memorial Hospital and will return to Minneapolis for work in the Institute of Child Welfare.

Residents of Ancker Hospital, Saint Paul, Minnesota, who completed their terms of service June 30, 1933, have made the following plans for the future.

Dr. M. O. Thoreson will practice in Saint Paul.

Dr. E. V. Fortmiller will go into practice somewhere in Oregon.

Dr. B. F. Sowers will practice in Michigan following a two months' canoe trip through Minnesota and Canada.

Dr. H. C. Andre will continue as surgical resident at Ancker Hospital.

Dr. T. R. Fritsche will continue on the eye, ear, nose and throat service and Dr. Robert Wheeland will also remain for a few months longer.

Dr. E. L. Maeder will remain another year on the obstetrics and gynecology service.

Among the present interns who will stay as residents are: Dr. T. R. Montgomery as pathologist; Drs. W. A. Merritt, J. H. Tillisch, B. H. Brunkow and R. J. Cairns as residents in medicine and the receiving room.

Those who will go as residents to other hopsitals are: Drs. C. L. Cain, St. Joseph's, Saint Paul; C. W. Walters, Eitel, Minneapolis; G. W. Hopkins, St. John's, Saint Paul.

The Army has claimed Dr. J. J. Mack and Dr. R. H. Nyquist in national service.

Dr. E. B. Tuohy will go to the Mayo Clinic, Rochester, where he has a Fellowship.

Among the interns whose plans are as yet somewhat indefinite are the following:

Dr. H. W. Morgan will engage in general practice.

Drs. J. R. Cooper and B. T. C. Fenton will practice in Nebraska; Dr. N. W. Fawcett in North Dakota; Dr. C. C. Nelson in Essex, Iowa; Drs. H. V. Hullerman, E. A. Thacker, and W. C. Dine in Illinois; Drs. R. L. Windsor, E. M. Sorenson and G. Olson in Minnesota.

Dr. Alexander Slive plans to take postgraduate work at the University of Pennsylvania.

Drs. M. M. Heffron and J. M. Roberts have not made definite plans.

PLASTIC SURGERY

The following resolution condemning sensational presentations of plastic surgery by irresponsible and non-representative individuals and groups was adopted by the Society of Plastic and Reconstructive Surgery at its stated meeting at the N. Y. Academy of Medicine on May 26, 1933:

"WHEREAS, sensational stories frequently appear in lay publications concerning the cosmetic repair of the face and body with special reference to the correction of nasal malformations and the eradication of the stigma of age; and

"WHEREAS, these stories convey the erroneous impression that plastic surgery is purely for cosmetic purposes and involves procedures that may safely be performed by lay cosmeticians in an environment that does not provide the strict asepsis and other safeguards of a hospital operating room; and

"WHEREAS, these stories are designed to appeal to and promote the exploitation of, unstable and often psychopathic individuals who have no genuine deformity but are overly sensitive to negligible imperfections and the changes wrought by age,

"THEREFORE BE IT RESOLVED, THAT the Society of Plastic and Reconstructive Surgery take steps to inform the public

(1) that plastic surgery is a regular surgical specialty, embracing the reconstruction of defects and malformations that interfere with normal function as well as the repair of gross cosmetic deformities;

(2) that those engaged in the practice of Plastic and Reconstructive Surgery require the same scientific and technical training as the practitioners of any other surgical specialty and are bound by the same ethics, adopted in the interests of the public, that govern all reputable physicians, and

(3) that the safe performance of even minor plastic and reconstructive procedures demands the precautions and safeguards of a first grade operating room;

"AND BE IT FURTHER RESOLVED, THAT this Society condemn the performance of any plastic operations whatsoever by lay cosmeticians and the use of beauty shops, hotel suites and convention halls for this purpose;

"AND BE IT FURTHER RESOLVED, THAT this Society warn the public of the dangers of any surgery at unqualified hands and the unreliability of sensational, self-aggrandizing publicity;

"AND BE IT FURTHER RESOLVED, THAT this society urge the community to recognize the social aspects of plastic and reconstructive surgery and make it available, at competent hands, to the poor as well as the rich in cases where cosmetic or functional repair is genuinely indicated."

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

MINNESOTA COURT FORFEITS CHARTER OF MEDICAL CORPORATION

State of Minnesota ex rel. Harry H. Peterson, Attorney General, *vs.* Pioneer Mutual Health and Benefit Insurance Company of Minnesota, a corporation.

On June 2, 1933, the Honorable John W. Boerner, Judge of the District Court for Ramsey County, filed an Order vacating the charter of the Pioneer Mutual Health and Benefit Insurance Company of Minnesota. This corporation was organized by three lay persons in the city of St. Paul, ostensibly for the purpose of "maintaining a health service *or* insurance." Their plan of operation was to issuc so-called policies of insurance whereby the holder and others would get medical, surgical and dental services for $1.50 per month by going to the office of the physicians, surgeons and dentists employed by the Company.

The Minnesota State Board of Medical Examiners, believing the said plan to be in violation of law insofar as the furnishing of medical and surgical services is concerned, obtained the coöperation of the Attorney General of the State of Minnesota, the Honorable Harry H. Peterson, with the result that a Quo Warranto proceeding was started against the corporation on April 17, 1933. The case was argued on May 13 and continued to May 18.

The Court granted the defendants a stay of forty days in the event they desire to appeal the case to the Supreme Court of Minnesota. The case was handled for the State by the Attorney General with the assistance of Roger S. Rutchick, Assistant Attorney General, and F. Manley Brist, Attorney for the State Board of Medical Examiners. The Medical Board wishes to acknowledge the splendid attitude shown in this case by the Attorney General and his staff. While Mr. Peterson has served only since the first of the year as Attorney General, he has made it very clear in the handling of this case that such an attempted evasion of the Medical Laws of this state will be promptly and firmly opposed by his department and that the work of the Medical Board in the enforcement of the Medical Act and the Basic Science law will be aided in every manner.

Once again it has been demonstrated that the practice of medicine and surgery is not a commercial field open to exploitation by lay persons but is a profession limited to those who are educated, skilled, examined and licensed.

APPEAL TO SUPREME COURT

John Granger *vs.* Minnesota State Board of Medical Examiners

An appeal has been taken to the Supreme Court of Minnesota by John Granger of Minneapolis, Minnesota, from an order entered January 3, 1933, by Judge Reed in the District Court of Hennepin County. Granger had previously started a lawsuit against the Medical Board seeking an injunction against the Board in his attempt to prevent what he refers to as the unlawful interference by the Board with his business. Mr. Granger is not licensed to practice medicine nor healing in the State of Minnesota, but has been engaged in conducting a so-called health audit business which consists of periodical urine analyses and blood pressure tests. Mr. Granger charges his subscribers $10.00 per year for this service.

Judge Reed decided the case against Granger in the District Court, holding that Granger had not stated a cause of action against the Board. Briefs have been filed in the Supreme Court by both sides and the case will be one of the first to be heard by the Supreme Court when it reconvenes for its fall term in September. The State Board of Medical Examiners will be represented by the Honorable Harry H. Peterson, Attorney General, and F. Manley Brist, Special Assistant Attorney General.

ILLINOIS QUACK LEAVES STATE TO AVOID PROSECUTION

"Dr." Ray D. Smith, fifty-four years of age, who claimed that he came to St. Paul, Minnesota, from Clinton, Illinois, made a hasty departure from the State of Minnesota, on June 12, 1933, rather than stand trial in the District Court on a charge of practicing healing without a Basic Science Certificate.

For several days Smith had been maintaining a vending stand on the corner of Ninth and St. Peter streets. He would give a lecture about the human body using a wax model showing the internal organs. During his talk he explained that he had practiced medicine for twelve years and had spent two years at the Mayo Clinic, Rochester, Minn. Following an investigation made by the State Board of Medical Examiners, he was taken to police headquarters, where he retracted his statement about being a doctor and also denied having been at the Mayo Clinic. He was peddling a so-called Liberty Tonic which purportedly is manufactured by the Liberty Chemical Company, 260 Madison Ave., Memphis, Tennessee. The box is stamped "'Clyde Collins Chemical Co., Memphis, Tennessee."

"Dr." Smith is driving a 1928 Nash coupe automobile with Illinois license plates for 1933 numbered 1082733. The serial number of the car is 440458; the motor number 323683. Smith stated at Police Headquarters that he was in Minnesota only temporarily and was on his way to North Dakota and Montana. Smith is accompanied by a lady about twenty-five years of age who he states is his wife.

If these people are seen anywhere in the State of Minnesota, kindly notify the Minnesota State Board of Medical Examiners, 524 Lowry Medical Arts Bldg., St. Paul, Minnesota, and a warrant will be issued for Smith's arrest.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

July 5—Obesity and Heart Disease.
July 12—Chinese Medicine.
July 19—Insulin and Underweight.
July 26—Tumors of the Bladder.

MINNESOTA RADIOLOGICAL SOCIETY

The annual meeting of the Minnesota Radiological Society was held in Rochester, Minnesota, May 22, 1933, in conjunction with the annual meeting of the Minnesota State Medical Association. The following program was presented:

1. Radiation Therapy in Non-Malignant Conditions
   Gage Clement, Duluth
   Discussion by Wilhelm Stenstrom, Minneapolis
2. Correlative Value of Clinical and Pathological Findings in Roentgenological Diagnosis
   Kano Ikeda, St. Paul
   Discussion by Charles G. Sutherland, Rochester
3. The Place of the Roentgenologist in the Private Practice of Medicine
   Leo G. Rigler, Minneapolis
   Discussion by E. L. Tuohy, Duluth
4. Childhood Tuberculosis
   R. G. Allison, Minneapolis
   Discussion by C. A. Stewart, Minneapolis
5. Round Table Conference
   Roentgen Diagnostic Problems
   Conducted by B. R. Kirklin, Rochester

The following officers were elected for the coming year: President, Dr. Edward Schons, St. Paul; vice president, Dr. R. G. Allison, Minneapolis; secretary-treasurer, Dr. L. G. Rigler, Minneapolis.

STEARNS-BENTON COUNTY SOCIETY

The staff of the United States veterans hospital at St. Cloud entertained the members of the Stearns-Benton Medical Society at a dinner and meeting Thursday, May 25, at the hospital.

About fifty doctors attended from Stearns, Benton, Wright, Meeker and Douglas counties.

Dr. Hans Hansen, superintendent of the hospital, Dr. George L. Mosby and Dr. L. M. Brown of the hospital staff produced the program, which consisted of a discussion of various types of mental conditions and afflictions.

The visitors enjoyed a visit through some of the buildings, particularly the new construction of the past year.

AMERICAN CONGRESS OF PHYSICAL THERAPY

The American Congress of Physical Therapy announces its twelfth annual scientific and clinical session which will be held September 11 to 15, 1933, at the Palmer House, Chicago.

Each year these annual gatherings have increased in popularity. This is due to the splendid programs which are offered. This year efforts have been doubled to present a program which will appeal to every physician and technician engaged in the application of physical measures. Clinics and addresses deal with a variety of subjects, from the very fundamental to the more advanced. A large number of research reports will be made by prominent leaders in the field.

Physicians are urged to plan their vacations for this September session. The Century of Progress Exposition and this twelfth annual meeting of the Congress will make a week's stay in Chicago profitable and interesting.

As an unusually large attendance is anticipated those who plan to attend should make their hotel reservations as early as possible. Preliminary programs will be mailed on request. Write to the Executive Secretary, American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago.

OBITUARY

John Dexter Lyon
1875-1933

Dr. John Dexter Lyon, a practicing physician in Minneapolis for twenty years, died early Monday, May 29, 1933, of a heart ailment.

Born at Dexter, Iowa, in 1875, Dr. Lyon obtained his early education at the Iowa State Teachers College and Ames, spending a number of years subsequently as a teacher and school principal. He later entered Northwestern University to study medicine and was graduated in 1904. For nine years thereafter he practiced medicine in Chester, Iowa, and then opened an office in Minneapolis in 1913.

He was a staff member of St. Barnabas Hospital and taught physiology and anatomy to student nurses. He also was on the staff of the Asbury Hospital and was a member of the Hennepin County, Minnesota, State and American Medical Associations. His fraternal affiliations were in several Masonic organizations including the Knights Templar and Zuhrah temple.

Dr. Lyon is survived by his wife, three children, John D., Jr., Myrle C. and Ruth S. Lyon; three brothers, Charles W., of Des Moines, Iowa; Paul T., of Chicago and Ray B., of Paso Robles, Calif., and two sisters, Mrs. N. A. Richardson of Andover, Ohio, and Mrs. Rupert Bard of Gordon, Neb.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of May 10, 1933

The regular monthly meeting of the Minnesota Academy of Medicine was held on Wednesday evening, May 10, 1933, at the Town and Country Club. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. C. D. Freeman.

There were fifty-eight members and five guests present.

Minutes of the April meeting were read and approved.

Upon ballot Dr. Paul O'Leary, Rochester, was unanimously elected to Associate Membership in the Academy.

The following scientific program was given.

Dr. A. R. Colvin (St. Paul) reported the following case:

OSTEOMYELITIS OF THE ISCHIUM OF THE RAMUS

The case I wish to report this evening is interesting from the point of view of pathological anatomy and the rather unusual clinical symptoms. A girl fifteen years of age was admitted to the Ancker Hospital complaining of severe pain in the popliteal region and the calf of the leg. The lower extremity was held in outward rotation and attempts at inward rotation caused severe pain in the calf and popliteal region. Her temperature ranged from 101° to 103°. The movements of the hip joint, except internal rotation, were normal. There was no tenderness in the regions where the pain was felt; the pain was thus evidently a referred pain.

A study of the anatomy concerned explains the referred pain. The skin of the region of the calf and popliteal space is supplied by the obturator and lesser sciatic nerves. The external rotators of the hip, the gemelli and obturator muscles, take their origin from the ramus of the ischium surrounding the obturator foramen. From their origin here the tendons are slung around the ischial tuberosity and are inserted into the digital fossa on the inner surface of the trochanter major. Any attempt at internal rotation would exert a very direct pull on the ramus of the ischium. The muscles named are also supplied by the sacral plexus and obturator nerves.

Rectal examination revealed a tender, rather boggy feeling over the bone surrounding the obturator foramen. It is interesting that while tenderness was felt on palpation in the region of the obturator foramen, a pull on this region through the external rotator muscles caused pain only in the popliteal and calf regions.

From these findings it was concluded that we were dealing with osteomyelitis of the ramus of the ischium. An incision was made over the tuberosity of the ischium and a curved forceps passed up along the inner surface of the bone surrounding the obturator foramen. A small amount of pus was found. The forceps were then taken out and re-inserted along the outer surface of the bone and again a small amount of pus was obtained. Shortly after this her pain disappeared and internal rotation of the hip was again possible.

This case calls to mind another case of osteomyelitis of the same region which resulted finally in involvement of the body of the ischium and resulted in suppuration in the hip joint, with pathological dislocation.

Dr. S. E. Sweitzer, Minneapolis, reported the following case of pellagra, and presented the patient.

PELLAGRA, NON-ALCOHOLIC TYPE

This gentleman is one of fifty-seven cases of pellagra I have had in seven years. Of these fifty-seven cases, fifty-five have been of the type called alcoholic pellagra. This year I have had two of the non-alcoholic type. This man had a fairly elaborate diet but had no appetite and did not eat much. He had bacon, eggs, bread, meat, potatoes and still he came in with a frank pellagra, with a bullous eruption on the backs of the hands. You can see now on the backs of his hands a thickened condition and the pigmentation that has remained.

This condition of avitaminosis is important for this reason, that in dieting efforts to reduce, it is very easily possible to get quite a serious pathological condition. This man did not have any symptoms at all except the skin symptoms. In pellagra it is possible to have just one symptom; in this individual, an eruption on the back of the hands. In limiting diets, one has to be careful that he does not cut out the vitamins.

The second case of the non-alcoholic type of pellagra was in a sheep herder who had lived principally on hardtack and bologna.

Dr. E. L. Gardner, Minneapolis, read a paper entitled

CALCIUM DEFICIENCY ASSOCIATED WITH FUNCTIONAL GASTROINTESTINAL DISTURBANCES IN ADULTS

DISCUSSION

Dr. R. T. LaVake (Minneapolis): I would not take the liberty of discussing this paper were it not for the facts that this question of calcium metabolism is a hobby of mine and has from my experience become a matter of importance in my practice of obstetrics and gynecology. It has become a hobby because I came from a family in which spasmophilia and low calcium balance is rife, and I myself have had to consider my calcium balance for my own comfort. Calcium deficiency is a subject the importance of which, from my observation, is too frequently overlooked.

Dr. Gardner has brought out particularly the more marked cases of calcium deficiency, cases that can be demonstrated by x-rays or have marked symptoms. I would like to bring to your attention the importance of keeping in mind the frequent manifestation of minor grades of calcium deficiency. In obstetrics, this deficiency frequently manifests itself in muscle cramps, Chvostek's sign, headaches, and other tetanoid symptoms and signs. This heightened nerve irritability is a condition that is difficult for one to appreciate who has not been subject to it. To one low in calcium, if someone makes an unexpected noise, one feels like reflexly hitting him with the first article in sight. A few weeks of high calcium intake plus Vitamin D or sunlight and one feels as calm as can be. This change in nerve excitability is most startling. These minor symptoms may obtain in the presence of an apparently normal blood calcium estimation.

In the April 1, 1933, issue of the *Journal of the American Medical Association*, Alice R. Bernheim has an article on calcium metabolism that is worth your perusal. It is her opinion that the diet of most people in this country is deficient in calcium. The question is raised as to whether reputed longevity of Bulgarian peasants is not due to the high calcium intake rather than to the much-heralded bacillus of Metschnikoff. Experiments on rats point to a relative longevity of calcium-high rats over calcium-deficient rats.

So many of my gynecologic patients come in with peculiar headaches and general nerve irritability, especially demonstrable by Chvostek and Trousseau signs and other heightened reflexes. On these, I use calcium therapy even though the blood calcium is apparently normal. In the majority of instances results are strik-

ing. Headaches leave and the patient becomes more calm.

Dr. Gardner mentions menorrhagia, which is a frequent concomitant of calcium deficiency. If menorrhagia continues after diagnostic curettage, one should never remove a fibromyomata uterus for hemorrhage alone until he has thoroughly tried out a high calcium regime. Much meddlesome surgery will in this way be eliminated.

I feel that this is one of the most important subjects that we have had discussed in this Society for some time and would urge you to give it your very careful consideration.

Dr. Gustav Schwyzer (Minneapolis): As long as Dr. LaVake excuses himself in discussing this subject because he is a gynecologist, I can do the same because of the veterinary work I am doing of late. I became familiar with this deficiency of calcium in my own cattle. Possibly you may not be familiar with this fact, but the so-called milk fever which has killed so many cattle has been studied and it has been found that it is due to calcium deficiency. The original thought came from England, and the Minnesota University Farm has done some of the early work. The veterinarian today uses a 10 per cent calcium chloride solution, 100 c.c. injected under the skin or intravenously. A cow that is dying, after being given this calcium chloride, will in twenty minutes be up on her feet and feeding. I have had the experience of observing such results with my own cattle.

I thought it might interest you to know that, in addition to what we have learned from Dr. Gardner and Dr. LaVake tonight, this calcium deficiency is found in cattle also.

Dr. Gardner (in closing): A good way to check the diagnosis of calcium deficiency in suspected cases is to x-ray the hand along with a control on the same x-ray film. After treatment this method of examination may be checked and you will find an increase of density along with an improvement of the patient's general condition. It seems that much of our former speculation about the presence of calcium deficiency is justified by these radiographic studies. The extreme case may possibly be non-tropical sprue.

There are just two points to which I would like to call your attention. *First,* what relation has calcium deficiency to water supply? Does water in some localities supply considerable lime besides the dietary, and, if so, is there any excess of magnesium in the same supply? Some of the artesian wells in the Northwest and even in Minneapolis show considerable amounts of magnesium salts. *Second,* I believe we should reserve our conclusions as to the presence of almost universal tendency to a calcium dietary deficiency until after an allowance is made for this water supply.

I have tried in this discussion to keep away from speculation and deal only with objective facts. My impression is that mild cases of calcium deficiency are very common, but we have no absolute proof.

I wish to thank the gentlemen for their discussion.

Dr. H. E. Michelson, Minneapolis, gave a lantern slide talk on

THE TUBERCULODERMAS OF THE FACE

Tuberculosis of the skin is not a common condition in Minnesota, while in continental clinics lupus vulgaris in particular is seen very often. The same causative agent produces, in different individuals who are affected, a very different clinical manifestation.

The face is the most common location for tuberculosis of the skin. The type of lesion varies greatly, and the factors that bring about this variation are probably the state of receptivity of the host and the number and manner in which the bacilli are deposited in the skin. Pre-existing dermatoses and the circulatory type of the individual undoubtedly also play a role.

DISCUSSION

Dr. S. E. Sweitzer (Minneapolis): I wish to congratulate Dr. Michelson on this excellent presentation. The subject of tuberculosis as manifested in the skin is interesting from the fact that we see so little of it. In Europe one sees a tremendous amount of skin tuberculosis. There are various explanations for this, *i.e.,* the dwellings are so old and there are a lot of germs in the dwellings, the food is not so good as it is here, and they do not have so much sunshine. Also, in Europe they have developed more of an immunity to tuberculosis, and lung tuberculosis is not so severe. Here skin tuberculosis is not so severe; therefore, in Minnesota we should have more lung tuberculosis and not so much skin tuberculosis. For fifteen years I was connected with a tuberculosis institution and was amazed to see how few patients who had lung tuberculosis also had skin tuberculosis. The few cases we have picked up through all these years are those Dr. Michelson has seen at the University and I have had a few at the General Hospital. But we see very few, comparatively. Day after day goes by without seeing a case of skin tuberculosis. In Europe one can hardly go through any hospital without seeing a number of cases of tuberculosis of the skin. There must be some reason for this.

As to the question of nomenclature, we think these are all due to the same organism. We give various names for distinction in diagnosis. The cases differ histologically a little bit and also differ in the kind of treatment we wish to give them. They vary in these respects although they are due to the same organism.

The interesting thing in my experience is that we see so few cases of tuberculosis of the skin, and the ones we do see are largely lupus vulgaris, a few tuberculids, and some sarcoid. We see very few of these other cases mentioned. I have not been able to figure out any reason other than that patients in Europe are more strongly immunized and so have a greater tendency to skin manifestations.

The meeting adjourned.

R. T. LaVake, M.D.

BOOK REVIEW

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

THE GOLD-HEADED CANE. William Macmichael. Edited by H. S. Robinson. 223 pages. Illus. Price $3.50. New York: Froben Press, Inc., 1932.

Mrs. Baillie, widow of a famous English physician (Lives of British Physicians, London, John Murray, 1830), presented to the College of Physicians a gold-headed cane which had been successively carried by the Doctors Radcliffe, Mead, Askew, Pitcairn and Baillie. Dr. Macmichael endowed the cane with consciousness and the five chapters of The Gold-Headed Cane are its narrative of the professional lives of these physicians. The book, the first edition of which was published in 1827, is an entertaining sketch of English medical history from 1689 to 1823.

Royal C. Gray, M.D.

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XVI AUGUST, 1933 No. 8

President's Address

HISTORICAL ASPECTS OF THE MINNESOTA STATE MEDICAL ASSOCIATION*

N. O. Pearce, M.D.
Minneapolis

"IT is a requirement of our By-laws and is both customary and proper that such remarks shall be made by your Executive Officer as he may deem most conducive to the welfare and prosperity of the Society.

"I do not propose a didactic essay but simply desire to speak a few plain words in the hope that our Society and its objects shall be steadily and earnestly sustained, and preserved in, and that the good results which are already so apparent may be greatly augmented as the coming years pass before us.

"The incentives which have brought together so large a body of professional men, many from remote sections of the state, and all at no little trouble and expense, are not the incentives of self-interest, and self-congratulation, but they spring, we humbly trust, from the noble desire of sustaining and building up the profession we honor, the science and art of rational medicine—by meeting, consulting, and interchanging views upon subjects which everywhere and always must affect the well-being of communities. Let us lay broad and deep the foundation of a Society of which we may in time feel proud, and which shall endure, let us fervently hope, long after the responsibilities which now weigh on us have descended to other hands.

"In our labors let us prominently bear in mind that no sectional interests, or motives merely personal, should influence our deliberations, but that a purely catholic spirit should pervade and govern us, so that in all our doings we may work harmoniously together for the advancement, usefulness, and honor of our profession."

The words which I have just spoken are the first formal utterances of which we have record by a President of the Minnesota State Medical Association. This is the opening address of Dr. Samuel Willey, who was president of this Society from 1869 to 1871.

Tonight, in the midst of this great gathering of physicians in this great medical center, it seems to me fitting that we should turn back the pages of history and acquaint ourselves with the aims and ideals of the founders of this Society. I wish to acknowledge at this time that I am indebted for much of the material which I am presenting in this address to Dr. Arthur S. Hamilton and the Historical Committee, who have labored for a number of years to gather together facts concerning the early history of the organization. You may look forward with much pleasurable anticipation to the early publication of these volumes, which are replete with interesting historical material, written in a most entertaining manner.

For some time it has been the general opinion that the Society was first organized in 1855 and in the Transactions of the Society reference will be found to that effect in several places. However, there is no doubt that the initial meeting of this Society was held in Saint Paul in 1853. There were present at that meeting, and thus we may style them as the founders of the Society, the following gentlemen: Drs. Thomas R. Pott, James D. Goodrich, W. W. Finch, John J. Dewey, and T. T. Mann of St. Paul, John H. Murphy and Charles L. Anderson of St. Anthony Falls, A. E. Johnson, St. Anthony City, and Alfred E. Ames, Hennepin County.

The records of this meeting are very meager, but do show that the members wrote and adopted a constitution which, unfortunately, has been lost, with the exception of one article. The name of the organization adopted at this time was the Minnesota Medical Society. As this was in territorial days, the word "State," of course, was

*Presidential address before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 23, 1933.

not included in the name. The first officers of the Society were Dr. Thomas R. Potts of St. Paul, president, and Dr. Charles L. Anderson of St. Anthony Falls, secretary.

The meeting adjourned to convene again in St. Anthony Falls the following year. However, there is no record of such a meeting, and there are very few notes that would indicate that more than one, or possibly two, meetings of the Society took place during the following fifteen years. Surely nothing has been discovered later than 1857. Probably because of the war and the generally unsettled conditions, the Society did not again convene until 1869, when it met in Saint Paul, and we find Dr. Potts still recognized as president. Here it was decided after much discussion to abandon the old Society, reorganize into the Minnesota State Medical Society and adopt a new constitution. From this time on the Society met regularly; at first, annually and semi-annually, and after a few years, only annually. The Transactions and records of the Society's proceedings from 1869 to the present day are fairly complete. According to the arrangement, the Society met annually in the city of Saint Paul, and semi-annually in some other city. There are records of semi-annual meetings being held in Owatonna, Winona, Mankato, Rochester and several other cities.

Minnesota was admitted as a Territory in 1849, and at that time most of the Territorial Laws and Acts of the Territory of Wisconsin were adopted by the Territory of Minnesota, among these an Act which had to do with the practice of Medicine. This act provided in some detail for the formation of County Medical Societies, which were to meet on such a day as they should deem proper, in the place where the last term of County Court next preceding such meeting had been held. The act provided that they should elect a President, Recording Secretary, Treasurer, and three censors for one year. They were declared to be bodies corporate and politic, in fact and in name, and were by law capable of suing and being sued, and could adopt a common Seal, which they might alter and renew at pleasure. It further provided that all physicians and surgeons in the several counties who had received a diploma from any incorporated medical college or society of any of the United States or Territories or any foreign country could become members. It was provided that they could hold real estate for the uses of said Society, which real estate should in no case exceed the sum of $5,000.00. Further, they could make by-laws and regulations relative to the admission and expulsion of members, and examination of students. They were respectively empowered to examine all students who presented themselves for that purpose, and to grant them diplomas under the hand of the President and the Seal of the Society, which diplomas should constitute them members of the organization. No person could be admitted for examination as a candidate for diploma and membership unless he had arrived at the age of 21, had at least a good English education, and had studied medicine for at least three years with some respectable practitioner, and could produce satisfactory evidence of good moral character. The act provided for the levying of dues not to exceed $3.00 in any one year for the purpose of procuring a medical library, anatomical cabinet, chemical apparatus or for the encouragement of useful discoveries in the science of medicine. It seems on the face of it that it was an act of some importance in the control of the practice of medicine in the Territory of Minnesota, and would have been had it not contained a joker in the last section, which read:

"This act shall not be so construed as to prevent any person from practicing physics and surgery within this Territory who is not a member of said societies."

I have gone into this at some length because it brings up three interesting things: (1) that the medical societies were authorized to organize by law; (2) that they were authorized to examine and issue diplomas; and (3) that with one exception this was the only act governing the practice of medicine in the Territory and State of Minnesota until 1883. In 1869 there was a Medical Practice Act passed which seemed very comprehensive and reasonable and was evidently designed to prevent the practice of medicine by the numerous quacks and charlatans. This act, however, was again repealed in 1870, for the reason, as given by Dr. Willey in his address to the Society in that year, that the act was not satisfactory in many respects principally because it had failed to provide for any manner or means of its enforcement and had already become a dead letter. In the by-laws, adopted by the Society in the year 1870, appears a paragraph which somewhat amplifies the requirements of students for

receiving a diploma from the State Society. It says:

"They shall require satisfactory proof of the applicant that he has studied medicine with some physician and surgeon duly authorized to practice his profession for at least three years, that he has attended at least one course of lectures in a School of Medicine recognized by the American Medical Association, and that he has been in reputable practice for a period of not less than five years. They shall then examine him in the several branches of medicine and surgery, and if such examination is satisfactory, they shall issue a diploma under the seal of the Society."

Our Society has always been actively interested in legislation pertaining to the practice of medicine. In 1869 they named a legislative committee and passed a resolution in which they offered to assist the Legislature in any manner, provided it was desired to pass legislation controlling the practice of medicine by quacks and irregular physicians. They also passed resolutions requesting the Legislature to provide an act to authorize and provide for the collection of vital statistics; and later, it was through a resolution by the State Medical Society that the State Board of Health was organized. They were also interested in legislation for compulsory vaccination although considerable difference of opinion seemed to exist as to the comparative value of human pox and cowpox. They also urged the passage of an act establishing an asylum for inebriates, which was evidently, from discussion, in those days considered to be a disease, rather than a bad habit. These early meetings of the Society were characterized by much lively debate and interchange of opinion on many questions of scientific and economic interest. For instance, one of the first resolutions occurring in the Transactions of the Society was one which limited debate to five minutes by any member and which prohibited any member from speaking twice on the same subject without special permission from the Society. One of the questions which seemed to occupy a good deal of time and offered much difference of opinion was concerned with the propriety of admitting women to the Medical Society. Miss Harriet Preston of Rochester, a graduate of a Woman's Medical College at Philadelphia, applied for admission to the Society as early as 1870. Drs. Mayo, Stewart, Mattox, and Sweeney sturdily upheld the motion that she be admitted to membership, while Drs. Stone, Hewitt and Murphy led the opposition, and a heated discussion ensued. The resolution was finally tabled, partly on the basis that it had not yet been determined whether the regular schools would admit female practitioners, and partly because their respect for female delicacy would prevent them from freely discussing cases, for example, such a case as the congenital malposition of the bladder in a male, which male later proved to be a hypospadias in a baby only eight months old. Besides other objections Dr. Stone felt that physiological disability was the only true ground upon which women could be rejected from a calling which the good sense of the mass of mankind still teaches them to believe her to be unfitted for. Dr. Murphy recognized the inevitable in his comment, "This female woman question is looming up and you cannot stop it."

In the third annual meeting we again find Miss Preston in the list of those reported as duly qualified for membership and as representative of the claims of women practitioners she remained for some years a thorn in the side of the Society. Her application was again rejected at this meeting, the *Saint Paul Press* reporting the proceedings under the heading "No Women Need Apply." At the sixth annual meeting Dr. Preston's name came up once more, but she was again rejected by a vote of 13 to 27. Apparently the cause of the women then slumbered until 1880, when Drs. Harriet Preston, Edith Grew and Clara Atkinson, all members of Ramsey County Medical Society, were elected over a feeble resistance to membership in the State Society.

During these early sessions of the State Medical Society, the members were greatly concerned with proper medical education and the suppression of quacks. We gather from reading the Transactions that the quacks in Minnesota at this time were mostly what is known as irregular practitioners. The members of the Society were severely criticized for any consultation with one of these irregular physicians. It is interesting to note that it appears in the Transactions at this time that there were more irregular practitioners in Minneapolis than there were regulars, and in Saint Paul, almost as many irregulars as regulars, and in Rochester eight regulars to seven irregulars. It is apparent that these gentlemen in their early deliberations recognized many of the same principles that we recognize today. For

instance, the Committee report on the question of the suppression of quackery reads as follows:

"Your Committee after serious deliberation expressed the belief that laws regulating the practice of medicine do not and cannot reach the cause of the success of quackery among the people, but that that cause is to be found in the deficient knowledge on the part of the people in regard to the real ground upon which the practice of medicine rests, and that so long as the deficiency exists quackery will flourish. If legislative action is to be had it should be directed to the removal of the cause."

Malpractice suits flourished during this period and there was much concern over the unsympathetic attitude of the public. A committee was appointed to study this matter and reported somewhat as follows: First, that in cases where there was an accident which probably meant the reduction of a dislocation or fracture a physician should refuse to answer a call unless he knew that the party injured was honest and reliable. The second suggestion was that the physician require the patient to give in writing an agreement that he would in no way hold the physician responsible for any untoward results. The third suggestion was that a plaintiff in suing a physician for malpractice should be required to put up a bond which would cover all of the expenses to the physician in defending the case. The fourth suggestion, and the one which I'm sure we all wish might be adopted today, was to have legislation enacted which would require that all malpractice suits should be tried before a jury of reputable physicians. In reading the Transactions it becomes apparent that the attitude of the public was not at all friendly to the physicians and as there were apparently no insurance companies who were writing insurance for the protection of physicians in malpractice suits, you may be sure that this presented a serious problem. In the minutes of the Society at the meeting in 1876 we find the rather unique resolution:

"Resolved, that in the experience and observation of the Minnesota State Medical Society shortening in all fractures even under the most careful treatment known to the profession is the rule and normal integrity in the restoration of the length of the injured bone is the exception."

The dues of the State Society came up for frequent mention. The early dues were set at $2.00, but on more than one occasion we find a proposal which has a familiar ring, that is, that the dues be reduced. Even at this early date they seem to have had much trouble in collecting the dues as it appears that in 1874 it was necessary to place bills for unpaid dues in the hands of an official collection agency with instructions to collect by any means possible.

The American Medical Association, to which in those days the Society named as many as fifteen delegates, apparently was not having entirely smooth sailing, as the following State resolution would indicate:

"Resolved that while we admit existing imperfection and are willing to aid in effecting improvement in the organization and working of the American Medical Association we heartily disapprove of any and all manifestation of a spirit of fault finding among the profession or in the medical journals of the country, that have not at least a practical suggestion to offer in the way of reform."

As we are still today, they were also concerned for both the character of and the amount paid for expert testimony. It seems that the statutes left the fee for such testimony to be determined by the judge, and in some cases it was as low as $1.00 per day. They suggested at this early date that expert testimony should be provided for in such a manner that the witness would not appear to be testifying for either side of the case. The suggestion here originated that the client and the plaintiff each choose one expert and the court a third and their testimony to be given to the court for his guidance. Contract practice entered into the very early proceedings of the Society. At the meeting of 1870 the following resolution, which is almost identical with one we passed at this meeting, appeared:

"Whereas, bidding or proposing for public or private business, especially where it renders the party liable to come in conflict with other members of the profession, has a tendency to lower the dignity of the profession both in the estimation of its members and that of the public, therefore, be it resolved that such bidding or proposing is and shall be considered unprofessional."

The question of medical fees was often discussed at these meetings and particularly were the fees for insurance examinations, for post-mortem examinations, and for the examination of the insane. Dr. Hill, in his address to the Society in 1875, stated:

"It is a well known fact that the medical fraternity of the state with a few exceptions has not shared in the benefits of its rapid increase in wealth. In this respect we follow the general rule that it seldom falls

to the lot of the physician to become rich. A higher, holier and nobler motive must animate his daily life rather than the mere accumulation of the baubles of the world or his profession would prove as irksome as it frequently becomes a thankless one. And yet the physician must live like other men, and more than this, he must have time for study, for such is the rapid advancement of our science that he cannot do justice to his patient, himself, or his profession unless he keeps pace with its incessant progress. It is thus evident that if the entire time of the medical man is occupied in earning just enough for his daily bread he must soon fall behind the age and become incompetent to his whole duty."

Dr. Staples of Winona in an address before the Medical Society in 1871 made the following interesting observations regarding medical education. He said:

"Medical education in America is far below the wants of the profession and the interests of Society at large and immeasurably inferior to that in the principal parts of Europe. Humiliating as it may be nevertheless it is true, and so acknowledged by almost the whole American population. A great reform is needed and that need is known and appreciated and I would submit the following observations for your consideration: First, that the number of so-called medical colleges in this country is by far too great. There are in the United States 101 medical teaching bodies, only 61 of which are regular medical schools. A large number of these 61 medical colleges are located in small cities and country villages where facilities for the study of the practice of medicine and surgery are exceedingly limited and where to obtain a first class professional staff is out of the question. There has been a steady and totally ineffectual pressure brought to bear on the colleges by the better part of the profession for thirty years, in order to obtain better preliminary training, a lengthening of lecture terms, and the enlargement and improvement in the subjects of instruction. The medical colleges of this country are mostly joint stock corporations who furnish as little medical education as they can sell at the highest rate they can obtain, which rate, by the way, is often not very high. Their number is excessive and the competition between them is very keen. They are consequently disinclined to introduce any new features which may scare students of low requirements away or which may add seriously to the expense of the institution."

Among the suggestions which originated at this meeting were that the time of the medical college course be lengthened to five years, that the college instruction be systematic and progressive and that there be examinations for promotion from class to class, and for admission to any advanced class in the course. They say further that the plan of reading medicine in the office of a practitioner is at best ineffective and generally more novel than a real study of medicine.

I am sure from the foregoing that we all realize that the founders of our Society were men of wisdom and foresight. Their problems were not dissimilar to those we have today, and their reasoning and planning for the future as exemplified in the case of medical education was wise beyond their time. In fact, the very same economic problems confronted them as confront us, and the things which they advocated so many years ago are the things for which we stand today. If time permitted, it would be most interesting to review these early proceedings on other than economic subjects.

Of course, the greater part of the time at the annual and semi-annual meetings was devoted to the discussion of scientific subjects. There were certain fixed papers such as essays on certain subjects, but a great deal of time was spent in an interchange of ideas based upon the presentation of cases and upon personal experiences. Those diseases which seemed to occupy most of the attention of the Society in the earliest days were phthisis, intermittent fever, typhoid fever, spotted fever, diphtheria, scarlet fever and paludal disease.

One cannot but be imbued with the greatest respect for this fine group of pioneers, the early founders of the practice of medicine in Minnesota. In closing, I will quote from the last words of Dr. N. B. Hill, president and one of the early founders of the Society. It was indeed unfortunate and tragic that Dr. Hill, who presided at the morning session of the Society, suffered from a cerebral hemorrhage during a noon recess, from which he died shortly. However, his annual address from which I quote was taken from his pocket and read during the afternoon session. Among other things he said:

"At a glance over this assembly I recognize the familiar countenances of many veterans in our Society and memory painfully reminds me of many of our early associates who have passed away, and we are constrained to stop here and drop a silent tear in remembrance of their kindness, their earnestness and devotedness to our noble profession. Separated from civilization, surrounded by savages, and widely scattered, their opportunities for consultation and reunion were very limited. Yet, together with you, they are the founders of the Medical Society of the State of Minnesota. The early history of our state proves that they were prominent in the settlement and establishment of good society,

and aided in the promotion of the higher institutions of learning. They also figured in the interest and on the side of law and order in all the relations of life and as devotees of the noble profession of their choice we can proudly point to many bright examples among the living as well as the dead. Can we not then realize the feelings of a son in looking back to his ancestry and being gratified, nay proud, of our forefathers in medicine, the founders of the State Medical Society."

It seems prophetic that the only portion of the first constitution of this Society that has been preserved to posterity reads as follows: "The objects of this Society shall be the advancement of medical knowledge, the elevation of professional character, the protection of the interests of its members, the extension of the bounds of medical science and the protection of all measures adopted to the relief of suffering, and to improve the health and protect the lives of the community."

I can find no more fitting close for this address than the words of Dr. Staples, president of the Association in 1871, in which he said:

"We have the dignity and character of a noble calling to sustain, of a profession which has numbered for 2,000 years and more, some of the wisest and best men in all countries, and at all times. The goal of perfection is far distant. We shall never attain it, yet we labor none the less earnestly to advance toward it. Ours is not to make and adopt a code of ethics, and follow it as the unwilling subjects of an arbitrary law, but rather to inculcate such sentiments of honor and to cherish in our hearts such principles of justice as shall lead us, in all our intercourse with our professional brethren as well as with our patients, to act uprightly and to contend for the truth."

THE TREATMENT OF TUBERCULOSIS BY HYPERPYREXIA
PART II*

A COMPARISON OF THE TYPES OF TUBERCULOSIS IN DOMESTICATED ANIMALS AND THEIR NORMAL BODY TEMPERATURE

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THE treatment of human pulmonary tuberculosis by hyperpyrexia was begun at this Institution on September 3, 1932.† The basis for this form of therapy in tuberculosis was the result of the following observations:

1. Post-surgical rectal tuberculosis often heals with surprising rapidity and usually following the first operation. All these patients are routinely treated with hot Sitz baths.

2. Patients who develop pleural effusion with high temperature often show an improvement of a parenchymal infiltration.

3. Robert Koch[3] reported no growth on cultures of tubercle bacilli when they were incubated at a temperature of 42° C. (107.6° F.)

4. Man and the guinea pig, having similar temperatures, may be infected with human and bovine types of bacilli which find these hosts excellent media for growth. The rabbit with an approximate average temperature of 102° F. may be infected with both human and bovine types of bacilli, but the former type finds the rabbit a poor media for growth while the latter flourishes. The fowl, having a temperature above 106° F., is infected by neither the human nor the bovine types of tubercle bacilli.

This fourth observation seemed to us to be well worth elaborating. In cold blooded animals there are four types of tubercle bacilli which have various maximum thermo points at which cultures will grow. The highest of these is 98.6° F. and the usual non-growth point is much lower. The usual optimum point for culture growth[6] is 77° F.

Human temperatures were obtained from clinical observation and the usual average rectal temperature of 99.6° F. was accepted. Rectal temperatures were taken by us on five guinea pigs, three times a day for twenty days, thus giving three hundred temperatures. The average temperature was 100.408° F. with an extreme low of 98.0° F. and extreme high of 103.0° F. We

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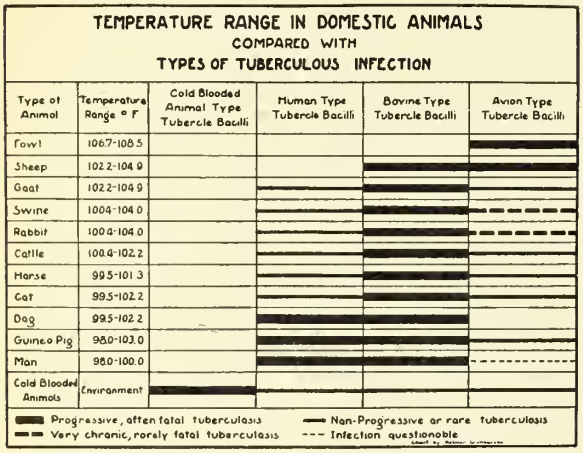
†"A Preliminary Report on the Treatment of Pulmonary Tuberculosis by Hyperpyrexia"—Drs. Duncan, Fenger, and Mr. Greene—has been accepted for publication by *The American Review of Tuberculosis.*

also took rectal temperatures three times a day on ten rabbits, 161 readings being taken. The average temperature was 102.15° F. with extreme low to extreme high range of 100.4° to 104.0° F. Species was not considered. The wide range of temperatures between low and high may have been due, to a certain extent, to the animals' struggle while being handled. The record of the temperature of dogs, horses, cattle, swine, goats, sheep and fowls was taken from the work of Malkmus.[5] The temperature of the cat was given us by personal communication with Dr. W. L. Boyd, Professor of Veterinary Medicine of the University of Minnesota.

Cold blooded animals such as the fish, amphibia, and reptiles are usually susceptible and may suffer fatal tuberculosis when infected with the cold blooded animal type of tubercle bacilli; human, bovine and avian bacilli will remain alive in the dorsal lymph sac of a toad for years but never cause progressive disease, nor are the strains altered. Cold blooded tuberculosis is not found in mammals or birds. Human and bovine types of tubercle bacilli flourish in man and, according to L'Esperance[4] and Doan,[2] there is some evidence in favor of the conclusion that Hodgkin's disease is caused by the avian bacillus although this point has not been settled. Isolated cases of avian bacilli found in tuberculous appearing lesions in man have been reported by Rabinowitsch (1907), Jansco and Elfer (1910), Lowenstein (1913), Lipschutz (1914), and others.[1] Guinea pigs may receive fatal infections with either the bovine or the human type. Experimentally when injected with avian bacilli they exhibit Yersin's phenomenon or often a local abscess at the site of inoculation. Dogs are resistant to avian infection, but have been found to have natural infections with both human and bovine types. Cats are resistant to avian tuberculosis, but according to Rabinowitsch (per Calmette) may have human or bovine types of infection. According to the Medical Research Council of England, twenty cats were examined and all had bovine type of infection, while the human type is retrogressive; thus the cat may be used for typing. Experimentally the horse has been occasionally infected with the avian tubercle bacilli. In nature, progressive tuberculosis is produced in the horse by the bovine type while non-progressive tuberculosis is produced by the human or avian types. The cow may be given a local abscess by inoculation with the human type of bacilli and also may be experimentally infected with avian tuberculosis. These lesions are retrogressive. Human and avian bacilli have been isolated from the mesenteric nodes in natural infection in cattle. The chronic progressive tuberculosis seen in nature in cattle is always bovine. The rabbit may be given local retrogressive lesions with the human type; progressive fatal tuberculosis with the bovine type; and joint, testicular and areolar tissue tuberculosis with the avian type. The avian type is considered to be midway in virulence between the bovine and human types. Natural tuberculosis in rabbits is either bovine or avian. Swine are infected in nature with all three types, the human giving discrete local tubercles in the submaxillary glands, the bovine giving severe local and generalized fatal tuberculosis, while the avian gives local infections in the submaxillary and mesenteric glands which occasionally become generalized. The goat is more resistant to the human type than the rabbit. Calmette and Guèrin have succeeded in infecting the teat of a lactating goat with the human type, but this is only a local lesion and retrogressive. The disease in nature is always bovine although Jough, Steriopolu and Bang and also Calmette and Guèrin have succeeded in infecting young goats with the avian type. The natural infection in sheep which has been studied has been about equally divided between the bovine and avian types. A. Stanley Griffith has reported that "there are no authenticated instances of natural infection in domestic fowls either with human or bovine bacilli."[6] The type of infection is uniformly avian.[1, 6]

The parrot is highly susceptible to both avian (according to Calmette[1]) and bovine (according to F. Griffith[6]) tuberculosis. Griffith believes avian the least virulent of all three types of tuberculosis found in this bird. Authentic cases of parrots developing the human type, particularly on the skin, but going on to generalized disease, have been noted.[1] We took cloacal temperatures on four different species of parrots at the local Zoological Gardens. There was a variation from 101.8° to 104.6° F. Only one temperature per bird was taken. Considering the number of species and the apparent marked variation in species temperature, it is not surprising that investigators have had conflicting results and that all three types of disease may be fatal. Due to the few

temperatures on only a few species of parrots, we did not include this type of animal in the following diagram.



These facts are summarized in the diagram. It is noticeable that progressive disease is produced by different types of tubercle bacilli, according to the temperature range of the animals. For example, in the fowl, the avian type is the only one that causes disease. Lesions may be produced by several types of tubercle bacilli in animals of relatively lower temperature. For example, in cold blooded animals the mammalian and avian types of bacilli may live but never produce progressive disease. Progressive disease is produced only by the cold blooded animal types of bacilli. It is surprising that a biological phenomenon, such as disease, due to various types of Koch's bacilli, in domesticated animals, can be plotted so accurately against a numerical ascension, such as the normal temperature of the various animals studied.

Applying this graph to man, one wonders whether a therapy based on hyperpyrexia may not produce conditions which are unfavorable for the growth of the human type of tubercle bacilli.

Conclusion.—There is definite correlation between the normal body temperature of domestic animals and the type of tubercle bacilli which produce progressive disease in them.

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SIMPLIFIED OLEOTHORAX*

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ALTHOUGH the practice of introducing large amounts of oil into the thorax has been carried on for a decade, there remains today considerable discussion as to the value of this procedure. That the principles and technic of oleothorax still require thorough inquiry is apparent to those who analyze the literature and investigate in the clinic and laboratory. It is evident that some of the basic orthodox ideas which seem to have been established and irrefutable need complete revision.

The induction of oleothorax involves the injection of certain oils, singly or in combination, into the pleural cavity for the purpose of utilizing the mechanical and disinfecting properties of the media selected. Although Bernou is credited with the introduction of oleothorax on a comparatively large scale in 1922, it must be remembered that the possibilities and advantages of

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such procedure were considered many years previously.

Woodcock referred to experiments made by Lloyd, Coplans and others in 1913 and previously, relative to the absorption of paraffin by the peritoneum and pleura. During this year Woodcock reported upon the subject of paraffin injections into the pleural cavity before the International Congress of Medicine in London. This author refers to the encouragement given by Saugman.

However, it must be admitted that new impetus and considerable thought have been added to the subject by the labors of Bernou and his associates. The history of the development of oleothorax is one which introduces the names of many scientific investigators such as Bernou, Kuss, Rist, Recklinghausen, and Weil.

In connection with the history of oleothorax it is interesting to note that from time to time various chemical, bacteriological and pathological studies have been made for the purpose of developing the proper conception of this particular method of treatment. Such studies are constantly being carried out in various institutions and clinics and have led to more critical analysis than one would surmise in reading the more or less generally favorable literature.

The fact that certain institutions possessing high class clinical and laboratory facilities have found it necessary to pause to take stock in their enthusiasm, is significant. One occasionally reads an instructive article such as that of Dumarest which emphasizes the need of a reconsideration of all phases of the subject.

The author hopes in this article to stimulate constructive thought by reviewing the older ideas, as well as by proposing some new factors relative to oleothorax.

PHARMACOLOGY

There are so many oils and combinations of oils and other substances in use today that it would be difficult to make a detailed review of their medical properties and physical characteristics without exhausting the patience of the reader. Despite the fact that gomenol has been used not only for oleothorax but for many other conditions, it is rather striking that the average physician is quite unaware of the composition and properties of this oil. The Council on Pharmacy and Chemistry of the American Medical Association has not published any report concerning gomenol, but discussions of the composition of this oil were published in the *Journal of the American Medical Association*, April 4, 1914, and again in abstract, October 28, 1924. The description of various basic oils used, such as mineral, cottonseed, and olive oil, is included in a number of articles which are readily available. Some have denied the value of oil and have selected other media, such as gelatin. Many different chemical solutions have been used for irrigation of, or installation into, tuberculous chest cavities. Although each solution has its champions, not one has as yet produced such uniformly good results as to induce the profession to accept it as the best.

That one should investigate thoroughly the pharmacology of the agents employed is readily apparent in view of the differences in viscosity, solubility, or miscibility with water or body fluids, physiologic and chemical effects, local irritation and tendency to toxic disturbances. The study of the pharmacology of the oils bears upon the question of their introduction into the pleural cavity, miscibility with effusion and removal. There is, of course, also the advisability of inquiring into the matter of deterioration. There are definite advantages and disadvantages which must be weighed, and these can only be truly evaluated through a clear understanding of the various properties which characterize each medium and combination of media.

With reference to the essential oils and their disinfectant properties, it may be said that the determining factors are the nature and proportion of the active constituents. The essential oils are antiseptics rather than germicides and in dilutions the germicidal effect is considerably less than ordinarily claimed. The presence of pus or other protein-containing substances usually causes a great reduction in the germicidal activity of most substances. The value of certain antiseptics such as eucalyptus, creosotes, gomenol, and turpentines as pulmonary antiseptics has been greatly exaggerated.

For practical purposes we may consider three closely related oils or groups of oils from among the large number in existence. First, oil of eucalyptus, which is known to all of us, is obtained from dried leaves of Eucalyptus globulus (Family, Myrtaceæ). This contains pinene, terpineol, and cineol or eucalyptol (about 70 per cent).

Oil of eucalptus is dextrogyrate. Second, oil of cajaput is a volatile oil obtained by distillation of fresh leaves and twigs of several varieties of Melaleuca leucadendron (Linne, Myrtaceæ). The chief constituent is cineol (about 67 per cent). Third, Gomenol or Niaouli oil is a volatile oil obtained from leaves of Melaleuca viridiflora. This has as its chief constituent, cineol (66 per cent). It is dextrogyrate. This oil is obtained largely in the region of Gomen, New Caledonia, which is a French possession. It has long been recommended for the chronic catarrhs of pulmonary mucous membranes.

This brief reference to the composition of the three oils indicates their close relationship. The writer has made careful observations of the properties of these oils and wishes to acknowledge with thanks the assistance given him in his study by the Department of Pharmacy of the University of Minnesota.

It appears that mineral oil of especially good quality is from every standpoint the most suitable for the production of oleothorax. For various reasons, the writer has discarded gomenol and has employed oil of cajaput. In some cases antiseptic dyes have been added when they were thought necessary.

It has become apparent through certain investigations that there are positive disadvantages to the preparations now in use. This has led some to discard the method entirely or to use non-oily substances. With all these facts in mind, the writer has looked into the prolific field of colloid chemistry to assist in producing a preparation which would offset some, if not all, of the objections raised against the physical properties of the oils generally employed today. After considerable experimentation, a preparation has been obtained which possesses desirable properties. It may be injected through needles of the smallest caliber. It is readily miscible with effusions and is readily removable at any time as it does not cake. There is little likelihood of injecting too great a quantity of material under too great a pressure which in the past has been one of the causes of perforations. The colloid preparation is less irritant and less toxic, and when mixed with pleural effusions dilutes the substances irritating to the pleural surfaces, instead of forming layers in the pleural cavity.

SOME BIOLOGIC AND PHYSICAL FACTORS

There is considerable uncertainty at present in the contemplatation of the numerous biologic and physical factors which are involved in the critical analysis of the whole field of oil therapy. One must think of the nature and amount of effusion, advantages and disadvantages of a persistent air pocket, the possible changes in permeability of the pleural membrane under normal and altered conditions, the state of the pleura, and the altered condition produced by the introduction of a foreign body within the pleural cavity, as well as other important minutiæ.

Too much attention has been paid to the character of the pleural fluid, while on various and frequent occasions the condition of the pleura is ignored. There are those who maintain that the oil, *e.g.*, gomenol, is decidedly antiseptic or disinfectant. It is claimed on the one hand that this "non-irritant oil which has an antiseptic action on the pleural membrane" is attracting interest. On the other hand, we have the statement by Chandler and Gloyne that "no marked bactericidal quality against tubercle bacilli can be ascribed to gomenol or lipiodol." In one case the writer was able to obtain tubercle bacilli in culture and animal inoculation after constant contact of the "antiseptic oil" within the chest of the patient over a period of several weeks.

It is probable that the statement of Ross and Tulloch in Dundee is fairly representative that "oil, injected into the pleural cavity, will have an inhibitory effect on the tubercle bacillus."

Wells and Long, citing Fontes, believe the bacilli absorb the fat particles which form an isolating envelope, thereby insulating the bacilli from the nutritive medium. This is only a feeble and relative possibility inasmuch as thick layers of oil in vitro will not deprive the organism of nutrition entirely or even to a noticeable degree. One must be cautious in evaluating the claims of exponents or producers of various agents. In this connection, reference is made to an article in the *Journal of the American Medical Association* (April, 1914) quoting the advertising circular describing gomenol in which the statement is made, "the least trace of gomenol prevents the growth in vitro of the streptococcus, the tuberculosis bacillus and the gonococcus."

More important than the disinfectant action of the oil is the production of a thick and less permeable pleura which inhibits or delays the absorption of bacillary toxins and serves to hasten the development of fibrosis in or about the pleura

which, in all events, involves the feeder of the pleural pocket, *i.e.*, pleura and subpleural tissues on the one hand, and the patient's somatic system on the other. Pinner and Moerke have remarked that, "in patients under pneumothorax treatment for pulmonary tuberculosis and with pleural effusions, a marked decrease of pleural permeability is shown by actual experiments and must be assumed to exist from the results of chemical studies of the blood and the pleural effusion."

One is impressed in necropsy and laboratory observations with the bizarre formations in the pleura resulting from the contact of the oil with the pleura. Aromatized oil, even in comparatively weak solutions, is decidedly irritant to the healthy pleura, as has been noted by the writer in his laboratory animals.

Clerc remarks that "a massive intrapleural injection of gomenol oil provokes a severe pleural reaction in the healthy rabbit."

Occasionally, one observes definite inflammatory reactions manifested by severe pain following injection of oil. It is to be remembered that irritant effect may be produced by moderate injections as well as large ones. It is also to be borne in mind that a subsequent injection may provoke a reaction, whereas the first has been innocuous.

There is much to be learned concerning the permeability of the pleura before and after oil treatment. It is likely that much of the benefit derived from oleothorax depends upon the positive changes in the pleural surfaces, viz., fibrosis and other cellular changes.

Closely allied to the various biologic factors involved, and of utmost clinical significance, is the question of oil pressure within the pleural cavity. Although various methods have been devised to gauge this pressure, it is apparent to the observer that there are marked limitations to the employment of manometers in the estimation of the effect of a given pressure upon the diseased tissue. This is one of the factors which has led the writer to the development of the simplified technic, a point which will be discussed under the heading of technic.

It suffices at this juncture to repeat the words of Morin and Bouesse, *i.e.*, "Forcing oleothorax is flying in the face of disaster and abusing a method which, properly carried out, is excellent." It is to be remembered that inflammatory reactions produced at any time in the course of oleothorax may provoke the formation of exudates which lead to added and dangerous pressures such as no previous manometric reading can foretell. This has led the writer to the procedure of allowing a considerable pocket of air to remain as a buffer and regulator of fluid exchange, as opposed to the usual recommendation of meticulous removal of the last trace of air.

INDICATIONS AND CONTRAINDICATIONS

The literature contains many detailed descriptions of past and present conceptions of indications and contraindications for oleothorax treatment, but there still remains considerable confusion in the minds of many after a critical study of various declarations. Labesse and Marie trace the changing ideas concerning the application of oleothorax. In a recent book, "Ergebnisse der Gesamten Tuberkuloseforschung," oleothorax is dealt with—the historical and theoretical aspects, and the indications and contraindications for oleothorax, as well as the technic.

The indications as generally accepted at the present time may be summarized in a variety of ways. It is apparent that there are but a few cardinal indications which are not subject to considerable discussion and limitation. The sum total of these indications may be considered to be properly grouped under two main heads: (1) chemical, for the purpose of disinfection; and (2) mechanical, for the purpose of compression. The disinfection of pleuritic effusions in the course of pneumothorax treatment is extremely important. However, the possibility of such action is of necessity, at times, relatively slight. There are those who advocate oleothorax as a preventative against progressive adhesions and to collapse large rigid walled cavities, or to produce compression in cases unsuitable for continuation of pneumothorax.

One would hope after a decade of experiments in this much discussed procedure that a fairly uniform agreement could be reached with reference to indications. We find, for example, Pissavy, Chabrun, and Breger have abandoned gomenol as they found that it failed to prevent pleural synthesis in cases of pneumothorax exudate, although it aided absorption of exudates.

Curti has concluded that, "Gomenol oil does not seem to have any markedly antiseptic action on the tubercle bacillus."

Maendl advises the use of oleothorax as a substitute for artificial pneumothorax when frequent refills cannot be given. He is not alone in this recommendation. There are definite arguments against this type of indication which might at once place it in the category of contraindications.

Cesar Sillig and Milton Lang advise the employment of oleothorax in serous pleurisy which does not clear up. There are few who would recommend such interference without more positive indication of important disturbance caused by such effusions.

Gobel maintains that there is only one indication for treatment by means of oleothorax, namely, the early formation of adhesions during pneumothorax treatment. There are those, on the other hand, who would not attempt the use of oleothorax in the event of obliteration or threatened obliteration of a pneumothorax pocket.

Burnand has utilized successfully the injections of oil in cases of suppuration of the pleural cavity remaining after thoracoplasty.

There is quite general agreement that oleothorax is useful in the treatment of purulent tuberculous effusions complicating artificial pneumothorax, and this may be said to be a very definite indication for the exhibition of oleothorax either as a useful measure preliminary to thoracoplasty, or as a more permanent procedure in those patients having disease in the opposite lung, suffering from toxemia or serious complications, or otherwise not suited for surgical intervention, or more definitely in cases in which progressive improvement occurs under continued trial oleothorax treatment.

As one peruses the literature, it is obvious that the indications are quite as fluid as the medium employed. Such a state should not be so distressing to the casual observer as there has been similar uncertainty during various periods concerning the proper application of artificial pneumothorax. Just as we have learned that as a general proposition relatively small instillations of air under pressures lower than formerly used are preferable, so must we necessarily come to the inevitable conclusion that our indications and technic of oleothorax require reconsideration and revision from time to time. The indications as laid down by those most familiar with the use of oil must serve as guides and not as absolute postulates.

Just as important as indications for exhibition of oleothorax are the contraindications. When one is vexed by a serious situation and looks for assistance, he is apt to resort to the most promising aid without considering the possibilities for harm. It is often mentioned that a contraindication is the presence of pleuropulmonary fistula with a large opening. The word "large" is purely relative and certainly one is in doubt as to the presence or absence of a "persistent valve." The second contraindication, which is logical, is the presence of a serofibrinous exudate complicating artificial pneumothorax, as we are all aware of the tendency of these exudates to absorb spontaneously or to remain harmless for long periods of time. The presence of living and multiplying tubercle bacilli in this fluid occasionally disturbs the mental equilibrium of the operator, but he must be guided in this event by more pressing developments.

The substitution of oleothorax for pneumothorax as suggested by various writers is for the present to be mentioned only to be condemned. Curti has concluded "that the use of oleothorax to prevent the discomfort of refills is too risky to deserve consideration." The tendency to stress commercial and economic features in the treatment of tuberculous individuals to the extent of introducing great risks and actual danger is a practice which should not be countenanced. The inability of maintaining collapse on account of too rapid absorption of gas carries with it the connotation that some underlying pathology, *e.g.*, unsuspected pleuropulmonary perforation other than abnormal permeability of pleural tissue exists. If one will persevere, sufficient thickening of the pleura will occur in the majority of cases so that satisfactory collapse by air can take place.

It is exceedingly important to bear in mind the indications and contraindications, for by so doing it will be possible for the tuberculosis worker who will consider comparatively few cases for treatment to settle the problem in a satisfactory manner. It is to be borne in mind that many, perhaps the majority of tuberculosis workers, are carrying forth their efforts under little or no immediate supervision. They must of necessity be guided by the information obtained from literature and from their instinctive desire to do good work.

In connection with the question of indication and contraindication, it is the desire of the writer

to emphasize the fact that oleothorax must not be considered as a substitute for other forms of collapse therapy. The indications and contraindications, as applied to other forms of surgical collapse, must be weighed in a proper balance. There are several significant facts which are not, to my knowledge, definitely set forth in the extensive literature bearing upon the employment of oleothorax. There are, for example, those patients whom we ordinarily treat expectantly or not at all energetically, owing to excessive disease in the contralateral lung, to serious complications, or to unfavorable general conditions such as toxemia. Again, there are those cases in which we recommend active surgical intervention, only to find our recommendation rejected by the patient. There are certain patients in whom we may properly attempt the use of oleothorax in the hope that along with local and general improvement preparatory to surgical procedure, coincident improvement may occur within the chest, either leading to a much more favorable condition for surgery or entirely obviating the necessity of radical surgery. (See case of F. T. illustrated below.) Certainly in some cases, oleothorax may be justified as a guide during the period of watchful waiting in anticipation of surgery when it is not certain whether or not a serious complication capable of eliminating surgery is present.

ACCIDENTS AND COMPLICATIONS

Just as in other forms of compression therapy, so here have we the possibility for harm. As it has been shown above, that oil in any form is irritating, particularly to a healthy pleura, such effect must be reckoned with at the outset. Where the disease processes have led to the development of thickening of the pleura, there is less danger of irritation by oil. Irritation may be manifested only by pain or by further formation of pleural exudates. There may be, however, a constitutional reaction manifested by malaise and fever. Without any outward or systemic evidence of reaction there may be a collection of exudate.

Needle puncture sinuses form occasionally and are rather annoying. These are avoided in a large measure by removing the last drops of oil from the needle by means of water or novocaine and also by the use of several drops of tincture of iodine as the needle is withdrawn from the chest wall. The use of colloid solutions will remove this possibility in the majority of cases as one can use a needle of small caliber. Occasionally the oil, by reason of its bulk and weight, forces its way through the needle tract; such occurrence is to be expected in indirect proportion to the gauge of the needle.

One of the most feared and troublesome developments is the occurrence of a pulmonary or pleural tear. These may be caused either by a puncture of structure or by undue pressure from within or without. One must also consider the remote possibility of an oil embolism.

One must bear in mind that occasionally it is necessary or advisable to remove the oil. This evacuation is frequently a matter of difficulty and, as a matter of fact, has been one of the reasons for the desire to eliminate the use of oil. Here again, the colloid preparation demonstrates its superiority because of the ease of removal.

TECHNIC

It is obvious that the complicated descriptions of apparatus and technic, so often specious and impractical, have served only to lessen interest and impede progress in this type of therapy. One experiences uneasiness in adding still another method as he is never quite certain that he voices any sentiment but his own. However, the existence of these more or less untenable methods makes it imperative that there be developed a simplified technic, useful to the average therapist and available in every community. As one compares the various methods with a simplified one, he may quite readily observe the practicability and feasibility of the technic proposed and used by the writer.

Inasmuch as oleothorax therapy presupposes greater judgment and skill than is necessary in pneumothorax treatment, it is of greatest importance to make careful selection of patients. One must bear in mind all the indications and contraindications. He must not promise too much, as he is usually dealing with a condition which has already assumed a more or less serious aspect. Munro has said, "The outlook for the advanced case of tuberculosis is so hopeless that the patient's gratification at knowing that some treatment is being attempted seems to justify such liberties with oleothorax." The entire situation must be explained to the prospective recipient.

Having selected the patient, we proceed to the introduction of the oil. Much is said about the

relative advantage of the certain types and descriptions of oil. The experience and studies of the writer lead to the conclusion that mineral oil of best quality should be employed. One may have a choice of aromatic oils or antiseptics to be added to the mineral oil. The writer uses oil of cajaput, U.S.P. 10, rectified, which is water-white. It is well to incorporate, as necessary in proper amount, various dyes or antiseptics such as acriflavine, carmine, methylene blue, metaphen, rivanol, iodipin, or others, to assist in early detection of pleuro-pumonary perforations or to add antiseptic properties to the solution.

The outstanding change in technic, and one which the writer believes may lead to better results, is embodied in his development and use of a preparation in colloid form. Clinical and experimental use of this colloid preparation has led the author to consider that the value of oleothorax would be greatly enhanced with the more or less general adoption of a preparation such as he has used, with modifications, if necessary, developed after prolonged study.

Any disinfectant value which may be ascribed to the substances employed is based upon the proposition that, to be effective, a disinfectant must be absorbed by the bacteria.

It has been said that "colloid chemical factors largely control the action of antiseptics." It is possible that, by making more scientific studies rather than pursuing the original procedures, we may develop a colloid preparation which will actually serve as a true antiseptic. The writer has found it convenient to prepare suitable quantities of colloidal solution, preferably employing a colloid mill. The solutions are prepared in ampoules of various sizes. These are easily cleansed and warmed to proper temperature before using.

In view of the fact that any of the injections may result in reactions, it is considered advisable to inject 1 to 4 c.c. of 1 to 5 per cent of the essential oil in mineral oil as the initial dose. Courcoux and Bidermann maintain that, for whatever purpose the oleothorax is created, it is indispensable to test the pleural susceptibility by a trial injection of a small dose, being very prudent in the progression of doses.

In contrast to the use of the ordinary oil, one finds in using the colloid solution that it requires little pressure on the plunger and permits the use of needles of the smallest caliber. Both of these points are very important in technic as the necessity for great pressure favors the production of more or less serious effects. The larger the caliber of the needle, the greater the possibility of sinus formation.

Subsequent quantities are injected in arithmetical progression at intervals of one week or longer. In this connection it is well to bear in mind, that ordinarily we are not dealing with a serious emergency situation, and that haste and huge dosage should not be permitted.

If pus is present, moderate amounts should be removed at each treatment. In the course of subsequent removal of pus under the usual plan of procedure, one finds that the purulent material is present at the lower level, while the oil which has maintained its original physical and chemical qualities is supernatant. This at once impresses one with the futility of antiseptic action excepting through contact at the surface and by means of diffusion of aroma which, to the tubercle bacillus, may be a source of comfort rather than harm.

According to Bernou, a thin layer of oil above a purulent exudate cannot have sufficient contact to be very effective and may retain its gomenol almost intact.

One must not be over-enthusiastic about obliterating the pneumothorax pocket. As a matter of fact, the persistence of a small air pocket serves as a buffer in the event of increased hydraulic pressure due to production of exudates resulting from irritation of pleura by the oil. This lessens the possibility of perforation and tearing.

The most reliable means of checking the status of the oleothorax is the fluoroscopic control before and after injection of oil, as well as in the interim. Manometric readings are usually obtained, but they may be and frequently are misleading and subject to alarming change within a few minutes or hours.

The writer feels that the simplification of technic and the use of colloid materials are two steps which may lead the profession to a more general acceptance of oleothorax treatment, and to a more useful application of the procedure. Neither the solution nor the simplified technic is proposed as a sine qua non. It is in no spirit of controversy that the writer has made critical observations and comments, but rather with the thought that any procedure which has positive merit may permit of wider application. This is the pur-

pose and the function of the simplified technic.

CASE ANALYSES

The writer has derived much information from the study of the case reports cited by various authors. M. Fontaine, in grouping 100 cases of oleothorax, refers to five pulmonary perforations in the course of treatment. Frisch, reporting four cases, illustrates the uncertainty in technic and selection of cases, although his conclusions are of value. He emphasizes the necessity of small doses of gomenol and admits the possibility of antiseptic effects. Courcoux and Bidermann demonstrate the formation of cold parietal abscesses. They cite several interesting cases. Daniello and Alexandrov assist us by setting forth the complications in a large number of cases. They consider that satisfactory results have been obtained in a considerable percentage of cases. However, they report a high percentage of pleural irritations (74 per cent). Of two cases in which pleuro-pulmonary perforations occurred, recovery ensued, which is well to remember, for the possibility of perforation is ever present. These authors go on to a most complex classification of types and characters of oleothorax cases which in the end adds little to the value of case analyses.

Gullbring, after experience with fifteen cases, finds that acute tuberculous empyema with mixed infection is not favorably influenced by gomenol. His method is too heroic, inasmuch as in one case he employed 2,400 c.c. of oil and also in view of his recommendation that thoracoscopy should be performed. His use of oleothorax, combined with phrenicotomy in cases of basal cavities, is interesting.

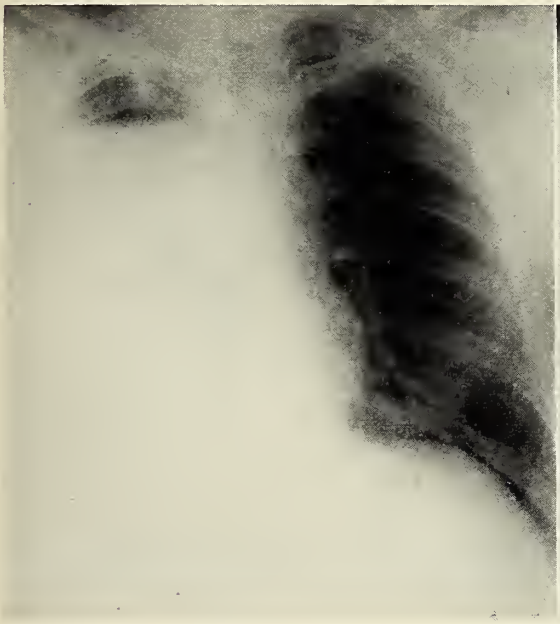


Fig. 1. Case 1.

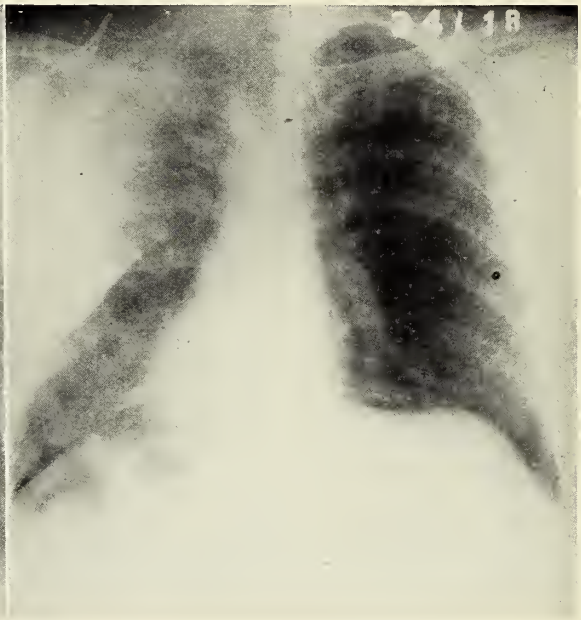


Fig. 2. Case 2.

Gunnar Hellsing refers to the healing of pleuro-pulmonary fistulæ and at the same time the avoidance of symphysis of the two leaves of the pleura. It is difficult to conceive how the oil, which retards the formation of adhesions in the pleura, can stimulate the healing of pleuro-pulmonary fistulæ.

Kuss cites cases of pneumothorax with unsatisfactory collapse of lesions, especially cavities, most of which are favorably influenced by strongly compressive oleothorax.

Morin and Bouesse emphasize the effectiveness of oleothorax in cases in which pneumothorax was inefficient in collapsing the lung. They caution against the high pressure oleothorax which Kuss and Bernou advocate. Their detailed description of observations in two cases is interesting although tedious.

Bufalini, in recording four illustrative cases, maintains that oleothorax has a special value in treatment of suppurative processes and if carried out cautiously is free from risk and is well tolerated.

Max Rosenberg sets forth in his monograph a safe guide to the uninitiated, citing seven cases in which oleothorax was used.

J. N. Hayes gives three case histories and emphasizes the danger of perforation of lung and oil embolism. He concludes that oleothorax, although a valuable adjunct to pulmonary collapse therapy, may be dangerous and requires very careful technic.

O'Reilly concludes that patients who have derived no profit from section of adhesions may obtain benefit from oleothorax.

The following five illustrative cases under observation and treatment by the writer are cited to demonstrate particular phases of this type of work:

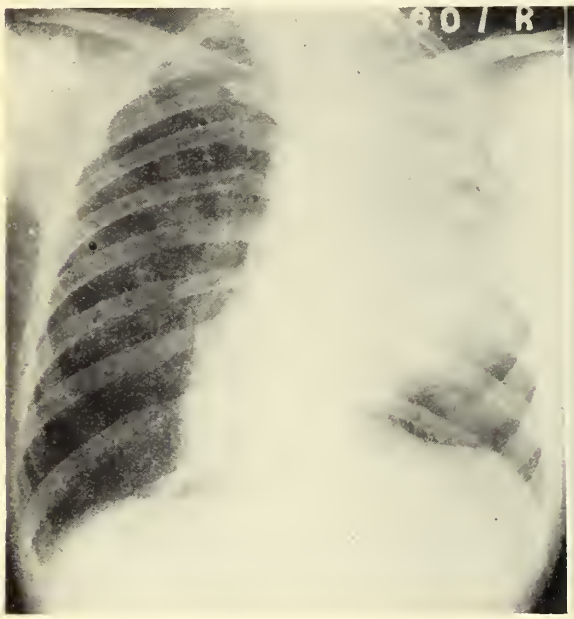


Fig. 3. Case 3.



Fig. 4. Case 4

Case 1.—J. A. was treated expectantly for over a year and then came under the writer's care for pneumothorax treatment. His progress was quite satisfactory until January 13, 1930, when spontaneous collapse occurred with the formation of purulent, tubercle bacillus laden fluid. On May 24, 1930, when it appeared that the pleuro-pulmonary perforation had probably healed, oleothorax was commenced with the hope of preparing this patient for thoracoplasty. The patient declined surgical interference and continued to do very well until January 30, 1932, when a pleuro-pulmonary perforation occurred following too enthusiastic efforts to produce a complete blockage. This patient had a remarkable chance for a satisfactory recovery, but his refusal to allow thoracoplasty led to the unfavorable result.

Case 2.—Following forcing of pneumothorax due to occurrence of repeated and alarming hemorrhages, purulent effusion occurred in the case of A. P. At the commencement of oleothorax, the patient's weight was 112 pounds, and the temperature ranged from 99.6° to 103° daily. At the end of two years' treatment, the patient was already symptom-free over one year. Sputum had been negative for over a year. The weight at the end of two years of treatment was 196 pounds. This patient was successfully treated by Dr. H. P. Bacon who has been interested with me in the study of oleothorax for over three years.

Case 3.—In the case of R. H., symphysis was occurring, and it appeared that oleothorax was indicated. The patient has had a satisfactory result. He has gained over forty pounds since the compression treatment was commenced.

Case 4.—This patient, G. B., illustrates the futility of forcing oleothorax where adhesions are too numerous. The treatment was continued because the patient repeatedly declined surgical intervention. The contralateral lung has become more extensively involved during the prolonged period.

Case 5.—F. T. offers a remarkable illustration of the usefulness of oleothorax in the case in which thoracoplasty seemed inevitable. Despite the fact that tubercle bacilli were found in the fluid after weeks of contact and mixture with the oil, complete recovery apparently is to be expected. The temperature and pulse have been normal for over eight months. The patient has gained 64 pounds in weight and is symptom-free.

CONCLUSIONS

1. The nature of conditions in which oleothorax is employed demonstrates that the ideal cases are naturally few, and that failure must be expected and watched for.

2. The indications and contraindications for oleothorax must be carefully weighed before proceeding to the treatment.

3. Treatment by means of oleothorax requires greater skill and judgment than treatment by pneumothorax.

4. The tuberculosis worker developing his technic should familiarize himself with the literature dealing with oleothorax.

5. One must not rely too firmly upon the antiseptic properties ascribed to oils.

6. It is certain that improvement in results will and must be obtained by a change in nature of material used, preferably, perhaps, the employment of colloid preparations as suggested in this paper.

7. The simpler the technic and the more effective the medium used, the more general will the confidence become with reference to the procedure.

8. Oleothorax treatment should not be expected to supplant surgical procedures which ordinarily offer promise of success.

9. Oleothorax may be considered in special cases as a preliminary step before treatment by surgical collapse, and in a small proportion of cases may obviate more radical procedures; also, it may be employed in special cases in which surgery is neither desired nor feasible.

10. Oleothorax, if judiciously applied, is to be regarded as a useful aid in the treatment of certain complications of pulmonary tuberculosis; and, if carefully followed out, should not be dangerous to the patient.

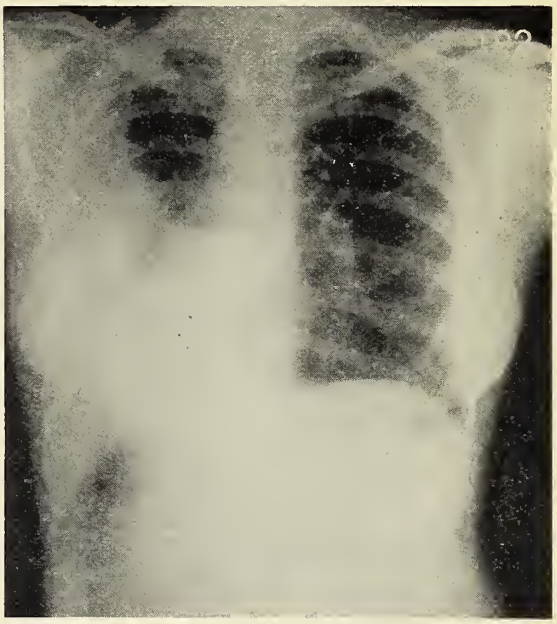


Fig. 5. Case 5.

11. Continued laboratory investigations are necessary to develop thorough knowledge of the mechanics, pharmacology, bacteriology, and pathology involved; ideas and results should be pooled and compared.

12. "Forcing oleothorax is flying in the face of disaster and abusing a method which, properly carried out, is excellent."

ALPHA-LOBELIN NOT ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that Alpha-Lobelin is an alkaloid of Lobelia inflata (distinguished from beta-lobelin and lobelidine) marketed by Ernst Bischoff Company, Inc., in the form of the hydrochloride in ampules containing 1/6 grain and 1/20 grain. The firm presented the product for consideration of the Council in 1925. The Council adopted a report postponing further consideration because of insufficient evidence of the therapeutic value of the drug. In 1927 the Council published a preliminary report on Alpha-Lobelin, calling attention to the numerous incomplete, and usually uncritical, clinical reports which have appeared. The report also stated that the paper by Norris and Weiss represents the most complete and critical report, both experimental and clinical, that had appeared on the subject. While the report was being considered, the Council's attention was called to the sensational newspaper reports of Alpha-Lobelin, and the work of Camp was cited as showing that the pharmacology of Alpha-Lobelin is closely similar to that of nicotine; that an analysis of its action showed that it exerts a weak nicotine action throughout the body. Ernst Bischoff Company, Inc., requested further consideration of Alpha-Lobelin in July, 1932, and submitted 108 pieces of advertising. Many of these pieces of advertising consist mainly of mere repetitions, and nearly all of them contain citations from the same authors. It has long been known that moderate doses of lobelin, like nicotine, stimulate respiration markedly. In fact, extraordinarily small doses of nicotine cause increased respiration in the frog, but neither nicotine nor lobelin has established itself as a respiratory stimulant in a greater number of cases, in which carbon dioxide and oxygen are now employed. In accordance with the foregoing discussion and the referee's recommendation based thereon, the Council declared Alpha-Lobelin unacceptable for New and Non-official Remedies because it is marketed with unwarranted therapeutic claims. (Jour. A. M. A., June 17, 1933, p. 1933.)

COEXISTENT CHRONIC INFECTIOUS (ATROPHIC) ARTHRITIS AND CHOLECYSTITIS: RESULTS OF CHOLECYSTECTOMY*

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Of the many hypotheses on the etiology of chronic atrophic arthritis that of its bacterial production from focal infection, although by no means universally accepted, is dominant in the United States. It has been accepted at The Mayo Clinic as the one which, in the light of present knowledge, seems best to explain the syndrome we prefer to call chronic infectious arthritis. There are three variations of the hypothesis with regard to bacteria. These are that arthritis is the reaction of the joint: (1) to bacterial metastasis, that organisms, of one or more types, breed in foci and from thence metastasize to distant regions, particularly to the joints; (2) to bacterial toxemia, that specific or nonspecific bacterial toxins, not actual organisms are disseminated to affect the joint, and (3) to bacterial allergy, the newer conception that there are liberated from foci bacterial products conducive to a special type of response from hypersensitive tissues. The considerations in this paper are largely based on an acceptance of the first premise.

Years ago, one of us (Judd) had felt that an infected gallbladder might be the primary focus in certain cases of chronic infectious arthritis; this seems particularly plausible when one recalls the persistence with which infections remain in and about the gallbladder. Cholecystic disease is most often caused by infection in the biliary tract and, although the infection is generally chiefly active about the gallbladder, it is often extensive in the biliary ducts, liver tissue and pancreas. Once these tissues, especially the gallbladder, become infected they seem to retain the infection for a long time. Although the symptoms of cholecystitis usually occur in short attacks, the underlying infection is probably actively resident almost indefinitely. Thus is afforded a likely source of focal infection.

Striking evidence of the part a diseased gallbladder may play as a probable focus of infection elsewhere is seen in the association between disease in the biliary tract and certain cardiac diseases. Recently Judd and Priestley made a follow-up study of 385 patients living more than twenty years after operation on the biliary tract and found that hypertension, arthritis, cardiac disease, and apoplexy in the order named were their most common complaints at present. It was formerly thought that patients with certain cardiac diseases coexistent with disease of the gallbladder were not good risks for cholecystectomy. In recent years, however, we have learned that such cardiac disease is often so definitely benefited by operations on the biliary tract, that, rather than affording a contraindication, it is now considered an additional indication for operation.

THE GALLBLADDER AS A REPORTED FOCUS FOR ARTHRITIS

The gallbladder seems to have been first incriminated as a possible source of an arthritic infection by von Dungern and Schneider, in 1898, who, at necropsy of a patient who had had arthritis deformans, recovered from the gallbladder alone diplococci which produced lesions of joints when intra-articular injections were given to rabbits. Since then certain clinical and experimental evidence indicates that in some cases cholecystic disease and disease of the joints may be causally related. Now the gallbladder has come to be listed almost as a routine as one of the possible foci in cases of arthritis. It is not, however, one of the more common foci, as a study of the relative incidence of infected foci in arthritis will demonstrate. Although the gallbladder has been mentioned as an occasional focus for disease of joints by Tubby in 1911, Billings in 1912, 1913 and 1914, and others, it has escaped mention entirely in several large series totalling about 1,000 cases of arthritis studied prior to 1922, particularly in relation to foci (Table I).

*Read before the first conference on Rheumatic Diseases, of the American Committee for the Control of Rheumatism, New Orleans, Louisiana, May 9, 1932.

†From the Division of Surgery and the Division of Medicine of The Mayo Clinic.

TABLE I. THE GALLBLADDER CONSIDERED A FOCUS FOR CHRONIC INFECTIOUS ARTHRITIS: COMPARATIVE FREQUENCY TO ORAL FOCI (OTHER FOCI NOT INCLUDED)

Author	Cases	Gallbladder	Teeth, per cent	Tonsils, per cent
Lindsay, 1908	172	Not mentioned		
Pemberton, 1920	400	Not mentioned	33.5	52.0
Richards, 1920	104	Not mentioned	48.0	40.0
Harding, 1921	300	Not mentioned	35.0	57.0
Total	976			
Billings, 1922	386	3 cases (0.8 per cent)	35.0	90.0
Mutch, 1925	200	Several	52.0	34.0
Cecil and Archer, 1927	200	6 cases (3 per cent)	33.0	61.0
Schauffler, 1927		Large number		
Pemberton and Pierce, 1927	545	Small percentage	54.0	31.0
Bockoven, 1928	119	5 cases (4 per cent)	38.0	21.0
The Mayo Clinic, 1930[16]	124	7 cases (5.6 per cent)		

In Billings, Coleman and Hibbs' review[5] of foci in 386 cases of arthritis there were only three cases in which cholecystic disease was considered a focus, less than 1 per cent, whereas infections of teeth and tonsils were present in 35 and 90 per cent of the cases, respectively. Since 1922 studies have incriminated the gallbladder in about 3 to 5 per cent of cases: thus Bockoven found an infected gallbladder in five cases (4 per cent) of 119 patients with arthritis; Cecil and Archer in six of 200 cases (3 per cent); Mutch[24] in several of 200, and Pemberton and Pierce in a small percentage of 545 cases. Billings, Coleman and Hibbs, in 1922, attributed chronicity of arthritis, after the removal of primary sites of sepsis, to secondary foci beyond surgical reach, or in the muscles and joints themselves. They cited cases in which relapses occurred after complete oral cleansing, and which were found to be associated with cholecystitis or appendicitis. Cecil and Archer have suggested that infectious arthritis is probably referable to the gallbladder more frequently than generally is supposed, and reported "two cases in which the focus of infection was undoubtedly the gallbladder. A good many cases of infectious arthritis occurring in middle-aged women without demonstrable foci are probably referable to infected gallbladders." To this, Schauffler, among others, agreed, being "forced to the conclusion that quiet pathologic gallbladders are not infrequently the secondary focus of an arthritis." The accuracy of his diagnostic criteria is open to some debate, however, as they are apparently based largely, if not entirely, on roentgen rays. "In the infectious group," he wrote, "in a surprising number without any distinct symptoms of gallbladder disease, gallbladder visualization showed a pathologic condition. Either the gallbladder did not fill with the dye, or more commonly, it filled slowly, and then failed to empty in any reasonably normal length of time." Evans has recently reported a case of gallstones as a cause of multiple arthritis and of carcinoma of the gallbladder, in which pains in the joints ceased entirely, and motion was restored after cholecystectomy. The patient, however, soon died of cachexia. Wilkie believes that the gallbladder is frequently the seat of chronic streptococcal infection and has reported in detail one of a number of cases of "rheumatoid joint conditions" in which there was lasting improvement after cholecystectomy. In Crowe's opinion, the teeth, appendix and gallbladder are the commonest sources of infection of chronic rheumatic disease.

Special training seems to play at least some part in assigning to the gallbladder importance as a focus of infection, for it is more often condemned by those interested in diseases of the intestine than by those more concerned with other organs. The former less frequently neglect a consideration of the gallbladder and can right-

ly be expected to diagnose its diseases earlier.

Many believe that foci in the intestinal tract exist less often in a culdesac (gallbladder, appendix, diverticulum) than as a diffuse infection or toxemia of the lower part of the bowel and to be enterogenous from infected food, or food contaminated by bacteria from oral foci, rather than hematogenous in origin.[12, 17, 23, 24, 32, 47, 48] Such secondary infection of the intestine or its appendages, it is argued, usually arises from a depreciation or loss of the normal bactericidal barrier provided by gastric acids. According to these investigators, the constant swallowing of septic organisms which maintain their viability because of absence or reduction of gastric acid permits widespread diffuse secondary invasion into the lower intestinal zone.

The liver is thought to share this insult: indeed, an hypothesis[41] has been advanced that chronic arthritis is due to primary, not secondary hepatic insufficiency; a failure on the part of the liver adequately to detoxify intestinal putrefactive substances. Gilbert, Fournier and Lereboullet have called attention to "chronic biliary rheumatism," Freund to "arthritis posticterica," and Weissenbach, Glenard and Francon to "Rheumatismes chroniques d'origine hepatobiliare." However, this is but speculation, for tests of hepatic function so far have given little if any tangible help[41, 44] and if the function is altered, Willcox believes it is probably due to a metabolic disturbance secondary to an extraneous cause, an infection or toxemia primarily outside of the liver.[47] Certainly in our hands search for diffuse intestinal infection has been unproductive.

Cowie and Pemberton[29] believe that biliary drainage by the Meltzer-Lyon method is of therapeutic as well as of diagnostic worth in cases of arthritis with indefinite but suggestive symptoms of cholecystitis, or with abnormal cholecystograms. Both have reported on patients whose joints seemed to have been definitely benefited thereby.

POSSIBLE RELATIONSHIPS BETWEEN INFECTIONS IN GALLBLADDER AND JOINTS

The mere coexistence of cholecystitis and arthritis does not, of course, prove any specific causal or bacteriologic condition. Such coexisting lesions may have four possible relationships, two indirect and two direct. They may be associated indirectly by mere coincidence, yet the lesion of the gallbladder may lower the patient's resistance sufficiently to prevent an adequate defense against an otherwise unrelated disease of the joint or when both arise from a common primary focus and neither is the cause of the other. They may be associated directly when the infection of the gallbladder acts as a focus for infection of the joint, or when germs from a preexisting infection of the joint become disseminated to invade, among other areas, the biliary tract.

There is no way of knowing exactly the mode and sequence of progression of infection. The relative time for appearance of symptoms may be helpful or deceiving. That the symptoms of cholecystitis arose before those of arthritis or vice versa does not prove that the first caused the second. One might argue that the two were entirely coincidental, that in about 3 to 5 per cent of any group of chronic invalids averaging forty-seven years of age, cholecystitis entirely unrelated might arise. Although we do not know the incidence of cholecystitis among patients clinically ill with various unrelated infections, we do know that the morbidity from cholecystitis in a general population is far lower than 5 per cent. According to the Hagerstown survey,[42] the annual rate is only 1.8 per 1,000 for both sexes (0.4 per 1,000 for males, 3.3 per 1,000 for females), an incidence of less than 0.2 per cent. Even though coincidental, cholecystitis might act as the predisposing cause of a chronic arthritis of quite different bacterial origin.

Infection of the gallbladder or joints might at different times arise from a common primary focus elsewhere. The work of Rosenow, Billings and their associates has demonstrated that bacteria from oral foci may disseminate both to joints and gallbladder. Thus cholecystitis may be a congener rather than a progenitor of arthritis. The infection of the gallbladder, in other words, is the "brother," not the "father," of the lesion in the joint. The studies of these authors on the elective localization of bacteria, particularly streptococci, have shown that germs in infected foci have in general monotropic characteristics, and tend to invade some favorite site rather than to localize indiscriminately. Thus organisms from foci of patients with arthritis, when injected into animals, generally produce lesions in the joints, whereas those from patients with cholecystitis tend to produce lesions of the gall-

TABLE II. ELECTIVE LOCALIZATION OF STREPTOCOCCI

Disease	Investigator	Streptococci from foci	Cases	Animals given injection	Lesions in surviving animals, per cent*	
					Joints	Gallbladder
Cholecystitis	Rosenow, 1915	Various	12	41	17.0	80.0
	Rosenow, 1927	Various	21	57	0.0	65.0
	Rosenow and co-workers, 1930	Various	56	177	9.6	45.0
Chronic arthritis	Moench, 1924	Cervix	12	73	43.0	15.0
	Meisser, 1925	Teeth	75	239	67.0	1.0
	Nickel, 1926	Various	138	328	51.0	2.0
	Rosenow, 1927	Various	17	41	66.0	0.0
	Nickel, 1930	Prostate	90	168	61.0	2.0

*For percentage localization in additional sites see original references.

bladder in animals (Table II). Furthermore, the germs recaptured from these experimentally induced lesions tend to maintain to a certain degree this property of elective migration through additional passage through animals.

Although this monotropism is highly selective, sufficient for the enunciation of the theory of elective localization, in some instances a degree of polytropism exists. Thus, germs from infected oral foci of patients with arthritis, on injection into animals, will in spite of preponderant arthrotropism, therein, occasionally also produce cholecystitis (Table II). Conversely, strains from infected gallbladders of patients, although usually highly productive of cholecystic disease among animals (80 per cent), will localize in joints in a small number (17 per cent).[34, 36] This characteristic of occasional polytropism likewise is retained by the strains recaptured from experimental lesions as well as those originally isolated from patients.[39]

In actual experiments, Rosenow found that bacteria from oral foci of patients with coexistent arthritis and cholecystitis on injection into animals often localized in both joints and gallbladder.[38] Nakamura found in the infected bile of a patient with arthritis, even after cholecystectomy, organisms capable of spreading either to joints or other tissues, including the gallbladder.

Does it not appear significant that the percentage of incidence of coexisting lesions of joints and gallbladders of patients is just about the same as the small percentage incidence of similar coexistence in experimental lesions? It would seem that it is this exception to the rule of elective localization, this feature of polytropism, that permits the production of lesions in gallbladder and joints related clinically and causally through a bacterial unity. According to Billings,[4] the infectious microörganisms carried in the blood stream from an oral focus may lodge in the terminal blood vessels of the joints or of the fundus of the gallbladder. In the gallbladder the inoculated blood vessel becomes wholly or partly occluded by endothelial proliferation and leukocytic infiltration, and blood containing the bacteria escapes into the wall of the gallbladder. Necrosis of the local tissues and rupture of the infected material into the gallbladder may occur, causing acute or chronic cholecystitis.

A more direct and closer genetic association between two such coexisting lesions may arise from the fact that an infection of the gallbladder, although secondary to an oral focus, may in turn be a primary focus from which germs are disseminated to other tissues. Thus, bacteria emigrating from cholecystitis may invade joints and be the cause of arthritis. Thus, too, joints infected from oral foci can, after these foci are removed, still harbor germs capable of spreading either to other joints or to other tissues, including the gallbladder. Hence cholecystitis may be the "father" of arthritis or the reverse may be true. It is Billings' belief that the latter is less likely to occur than invasion in the opposite direction, and our experience also suggests that arthritis arises from cholecystic infection oftener than the reverse.

CONCLUSIONS FROM REPORTED EXPERIMENTS

The tendency to localize electively within a limited range (monotropism) is, to cite Billings further, "most highly developed in the relatively nonvirulent strains isolated from chronic lesions, and after animal passage this tendency is less highly developed, the lesions occurring over a wider range, 'polytropism.' Since bacteria which have grown in a given tissue acquire greater affinity for this tissue, the likelihood of these bacteria to involve other structures is relatively slight; hence the secondary focus, cholecystitis, for example, would appear less important as a distributor of bacteria, for example, to joints, let us add, than the primary focus; if, however, the secondary focus happens to be in a joint, of which there are many, it may play an important rôle in causing extension to uninvolved joints and in preventing recovery."

From these various experiments so pertinent to our consideration, it is obvious that any one of several generic relationships may exist among infections of the mouth, joints, and gallbladder. Although in a given case it may be difficult to state which relationship obtains, when no obvious focus exists other than in an infected gallbladder, a clinical assumption is perhaps justified that the cholecystic disease may in reality be the cause of arthritis later. Although this cannot be determined exactly, we can observe the actual results of cholecystectomy in arthritis, and we can also carry on experiments to see whether organisms isolated from removed gallbladders have acquired polytropism, including the tendency to the invasion of joints.

EXPERIENCE, AND CLINICAL MATERIAL STUDIED AT THE MAYO CLINIC

Our experience coincides with that of others, namely, that cholecystitis appears in only a relatively small percentage of cases of arthritis. In a series of 124 cases of chronic infectious (atrophic) arthritis in which recent thorough examination had been made for foci, undoubted lesions in the gallbladder were found in five only; questionable cholecystitis occurred in two others, a total incidence of 5.7 per cent. Several questions arise: "Has the real focus for the arthritis been found?" "Was the poison coming from the gallbladder all the time?" "Were previous treatments useless?" In spite of a conservative attitude, carefully expressed by the internist and surgeon, the patient is likely to place high hopes on the results of removal of the gallbladder.

To determine how justified such optimism might be and to learn how much, if any, relief of arthritis might be expected from cholecystectomy, we have reviewed the cases of chronic infectious arthritis seen at The Mayo Clinic over a period of five years (1925 to 1929 inclusive) in which cholecystectomy was done for coexistent disease of the gallbladder. These fifty-nine cases represent a small percentage of the group of 10,242 cases of chronic infectious arthritis seen at the clinic between these dates.* We have tried to establish how frequently a bacteriologic association existed between the lesions in the joints and the gallbladder, and to determine especially how often cholecystectomy appreciably altered the progressive course of an arthritis.

Forty-nine of the patients were women, and ten were men. The average age was forty-seven years, about twelve years older than the average age of patients with chronic infectious arthritis. The youngest was twenty-seven years; the oldest, sixty-seven. All had come to the clinic with a chief complaint of progressive chronic arthritis. Practically all had extensive polyarticular involvement of a moderate to a marked degree of activity. Only five patients had arthritis in one to three joints. Eighteen patients had a moderate form of the disease and forty-one had a severe form. The order of frequency of the joints involved were hands, knees, feet, elbows, shoulders, lower part of the spinal column or pelvis, hips and neck. In only a few were the lower extremities alone involved and in such cases there was definite redness and swelling, not the comparatively benign picture of "hypertrophic" arthritis.

The average duration of the arthritis was seven and six-tenths years (shortest, one and a half months; longest, thirty years). Roentgenograms of joints showed periarticular swelling and atrophy of bone in eighteen, hypertrophic changes with bone atrophy in eleven, destructive arthritis in four, and mixed changes in four. Associated diagnoses were negative except that in five cases evidence was sufficient for a preoperative diagnosis of chronic appendicitis besides

*These figures do not include any cases of chronic traumatic, or static, gouty, or senescent arthritis, or any of the specific infectious forms. Nor does it include any of a large additional group diagnosed simply chronic arthritis.

cholecystitis. The histories revealed typhoid fever had occurred in fourteen cases and definite tonsillitis had occurred in nineteen. The former treatment of this group illustrated the usual varying degrees of intensity and haphazard selection.

As the average weight of patients with cholecystitis is somewhat above normal it may be noted that the weight of twenty-five of these patients was normal, eighteen were definitely underweight, and sixteen were overweight; all of the latter had arthritis not confined to weight-bearing joints.

In each case the preoperative diagnosis of cholecystitis was definite enough to afford a clear indication for operation, aside from any relief from arthritis that might result. This is obvious from the following: The average duration of the gastro-intestinal symptoms was ten and three-tenths years (longest, thirty-eight years; shortest, three months). Three patients had not had symptoms, but gallstones were noted in the course of roentgen examinations. Forty-one patients had had many acute attacks; the remainder less than six. Roentgenologic studies were made in forty-two cases and indicated cholecystic disease, with or without stones in thirty-nine. A normal shadow, but with stones, was reported in seven cases; disease without stones was reported in twelve, and diseases with stones in twenty. In three cases, the roentgenograms were negative, but at operation definite chronic lesions were found. In seventeen cases, roentgenograms were not made, the diagnosis resting on clinical grounds. Of these, stones were found in ten cases, papillomas in two and the pathologist reported chronic cholecystitis in five. Gastric analyses were made in twenty-three cases; in nine there was a reduction or absence of free hydrochloric acid; in five there was hyperacidity, and in nine the acids were normal.

CLINICAL RELATIONSHIPS BETWEEN SYMPTOMS OF DISEASE OF THE JOINTS AND GALLBLADDER

In twenty-seven cases arthritis had preceded symptoms, for which cholecystectomy was performed, from one to seventeen years (average seven years). In these cases the lesions of the gallbladder were probably not the cause of the lesions of the joints. The infection of the gallbladder may have come from the same source as the arthritis, or even from the joints themselves. In twenty cases the symptoms of disease of the gallbladder antedated the arthritis from one to twenty-six years (average eleven and a half years). With the reservations herein noted, one might assume that the disease of the gallbladder might play a part in the production or continuation of the arthritis. In one case the onset of the two conditions was coincidental. Time relations were not clear in eight cases, and there were no previous symptoms referable to the gallbladder in three. A few cases presented relationships worthy of special note. In one case in which many short attacks of gallstone colic had occurred over a period of eleven years arthritis developed on the fourth day of a recurrent acute gastro-intestinal upset. Two or three months prior to examination at the clinic one patient, who had had a history of arthritis for seven years, began to have acute distress in the upper quadrant of the abdomen. Cholecystectomy had been performed elsewhere. The wound continued to drain, during which time acute exacerbation of the arthritis occurred. Another patient had had a history of gallbladder trouble for eight years, and arthritis of three months. The arthritis came on two months after the gallbladder was drained, leaving a sinus. The arthritis of a woman of fifty-four years had its onset with transient, painless jaundice at the age of twenty-seven years. Five years later she began to have symptoms of chronic cholecystic disease. At operation acute cholecystitis besides a chronic lesion with stones was noted. This patient is one of those who has been completely relieved of any active arthritis since operation.

PATHOLOGIC AND BACTERIOLOGIC OBSERVATIONS AT OPERATION

The pathologic diagnoses were as follows: Chronic cholecystitis in forty-five cases; chronic cholecystitis with papillomas in eleven cases; acute gangrenous cholecystitis on old chronic cholecystitis in two cases, and subacute cholecystitis in one case. In forty of these fifty-nine cases gallstones were found.

Special bacteriologic studies were made of the wall of the gallbladder in thirty-one cases, of bile in twenty-one cases, and of gallstones in nine cases.[18, 33, 35] The technic of culture was that used by Rosenow, and by Judd, Mentzer and Parkhill. When the culture seemed suitable for

TABLE III. SPECIAL BACTERIOLOGIC STUDIES IN THIRTY-ONE CASES OF CHRONIC INFECTIOUS ARTHRITIS

Culture from	Cases	Organisms isolated	Animal inoculation	Lesions produced in	
				Joints	Gallbladder
Wall of gallbladder	10	None	Not done		
	10	Bacilli, staphylococci or mixed	Not done		
	7	Streptococcus viridans	6 strains	+	0
				+	0
				0	+
				0	+
				0	+
				+	+
	3	Staphylococci	3 strains	0	0
				0	0
				0	+ (slight)
	1	Bacilli	1 strain	0	+(empyema)
Total	31				
Bile	16	None	Not done		
	2	Bacilli or mixed	Not done		
	3	Streptococcus virdans	2 strains	0	+
				0	+
Total	21				
Stones	6	None	Not done		
	2	Bacilli or mixed	Not done		
	1	Staphylococci	1 strain	+	+
Total	9				
Appendix	4	Streptococcus viridans	4 strains	0	0
				0	0
				0	+
				+	+
Total	4				

injection in rabbits, this was done to see how often the organisms isolated were capable of producing lesions of the joints or gallbladder or both. Animal inoculations were not made with cultures from twenty of the patients, as the cultures were sterile, mixed, or otherwise not suitable. Animal inoculations were made with thirteen strains of organisms isolated from the remaining eleven cases (Table III).

Cultures were made from the wall of the gallbladder in thirty-one cases: Ten specimens were sterile. Bacilli, staphylococci or mixed cultures were found in ten other cases, and these strains were not used for experiments on animals. Streptococcus viridans was isolated in seven cases, staphylococci in three, and Bacillus coli in one case. Animals were given injections with six of the seven streptococcal strains, the three staphylococcal strains and the bacillary strain. The presence or absence of lesions of joints and the gallbladder in animals is shown in Table III.

Cultures were made from twenty-one specimens of bile: Sixteen were sterile; from two, bacilli or a mixed culture was obtained, and from three, Streptococcus viridans was isolated, two of the latter strains being injected into rabbits.

Cultures were made of stones from nine patients: In six cases the cultures were sterile, in two bacilli or mixed cultures were obtained, the strains not being injected into animals, and in one case a pure culture of staphylococci was recovered and used for inoculation of a rabbit.

Cultures were made from a few additional foci. Streptococci were isolated from the tonsils in one case and produced lesions of joints but did not produce cholecystitis. Cultures were made from biliary lymph nodes in two cases; streptococci from one did not produce lesions either in joints or gallbladder. Cultures were made from the appendix in four cases and yielded streptococci alone in one case, and streptococci and bacilli in three cases. These four strains of streptococci were isolated and injected into animals. Two of them did not produce lesions in joints or gallbladder; one produced cholecystitis but did not produce arthritis, the other produced lesions in both organs. One of these four strains from the appendix produced lesions also in the duodenum and colon and another lesion in the stomach.

Summarizing these bacteriologic studies, it is seen that cultures of stones and bile gave fewer

TABLE IV. POSITIVE RESULTS FOLLOWING INOCULATION OF ANIMALS: THIRTEEN STRAINS FROM ELEVEN PATIENTS

Strain	Cultures from	Lesion produced in	
		Joints	Gallbladder
1	Gallbladder (streptococcus)	Yes	Yes
1	Gallstone (staphylococcus)	Yes	Yes
1	Appendix (streptococcus)	Yes	Yes
2	Gallbladder (streptococcus)	Yes	No
5	Gallbladder (3 streptococci; 1 bacillus, 1 staphylococcus)	No	Yes
2	Bile (streptococcus)	No	Yes
1	Appendix (streptococcus)	No	Yes

positive results than cultures from emulsions of the wall of the gallbladder, as has been the previous experience of Rosenow and Judd, Mentzer and Parkhill. The results of injections in animals followed by positive lesions of joints or gallbladder are enumerated in Table IV. Arthritis was produced by injection of bacteria from three gallbladders, one stone, and in one case from the appendix. Lesions of joints were not produced by the injection of two strains of bile, seven of ten strains of gallbladders, three of four strains of appendixes and a strain from a regional biliary lymph node. Cholecystitis was produced in animals after injecting bacteria from six gallbladders, two specimens of bile, two appendixes, and from one stone. Lesions of the gallbladder were not produced by four of ten strains from the gallbladder and two of the four strains from the appendix. As indicated, some produced lesions in both joints and gallbladders and others did not cause lesions in either site. Little additional polytropism was evidenced by the strains used from the wall of the gallbladder; small hemorrhages in the stomach were found in one case. Although many of these diseased gallbladders did not contain at the time of culture arthrotropic or other bacteria, one cannot be absolutely sure that previous infection therein bore no etiologic relationship to coexistent arthritis. Some of the gallbladders were removed in the stage of relative inactivity. Previous studies indicate that the incidence of positive cultures from gallbladders bears a definite relationship to the clinical activity and pathologic evidence of the infection therein. From these results it would seem justifiable to conclude that the gallbladders of some of these patients, at least, harbored germs which could have been the cause of disease of the joints as well as of the cholecystitis.

RESULTS OF CHOLECYSTECTOMY ON ARTHRITIS

One of the fifty-nine patients, a woman, aged fifty-five years, died of postoperative pneumonia. Three patients have died since dismissal; one in an automobile accident five months later, one of pneumonia fifteen months later, and one two years later of an unknown cause. A follow-up study has been made of the remaining fifty-five patients. Forty-six replies have been received.

In five cases, the arthritis has stopped entirely, the patients receiving, as they wrote, "100 per cent relief." Three of them noted that improvement in the joints began immediately, the other two stated that it began three to six months after cholecystectomy. All five of these patients had suffered marked activity of polyarticular arthritis of two and fourteen months and of eleven, nine, and twenty-seven years' duration. In two cases, the symptoms from the gallbladder long antedated the arthritis; in the other three the arthritis antedated symptoms of cholecystitis. In four of these five cases no other foci had been removed at the clinic; in one case a tooth had been removed. In four no treatment except an occasional application of heat had been given since dismissal; in one case a tooth had been removed since dismissal.

Eleven patients reported marked or almost complete relief of arthritis, the duration of which had been two, two, and three months, and three, four, four, six, seven, seven, fourteen and twenty years. Eight of these had not had other foci removed at the clinic. Two of these noted onset of the improvement from the time of operation. Definite relief was obtained by the others from one to six months later. Seven had not been treated since operation. One had infected teeth removed since dismissal. Four had had occasional physiotherapy.

Eight patients reported definite, although moderate, improvement of the arthritis; one began to improve at operation. The others reported a delay of from one to six months, four of them without any other treatment. Six patients were only slightly improved. Nine were not relieved but the arthritis did not progress further. The arthritis of seven was worse, either by further

activity in old sites or progression to new ones. The patients who obtained little if any relief had had arthritis from four to fifteen years.

TREATMENT IN ADDITION TO CHOLECYSTECTOMY

Although these patients had had many foci of infection removed prior to their admission, other foci besides cholecystitis were found in some cases. Treatment of additional foci (removal of teeth, tonsils, appendix, or cautery for cervicitis) was carried out in thirteen cases. At cholecystectomy the appendix was removed in twenty-nine cases; in twenty-four of these it was removed incidentally; in five, a preoperative diagnosis of associated appendicitis was made. The pathologic examination of these appendixes showed inflammation grade 1 in thirteen and grade 2 in fourteen, grade 3 in one, and grade 4 in one. In only four cases were cultures made for animal experimentation. Thirty-eight of the patients were advised to have additional foci, chiefly in teeth and tonsils, removed at home, but were to postpone removal to see the effect of cholecystectomy. Of the twenty-four patients improved by operation, five have since had such foci removed. Four have tried vaccines since dismissal. Eleven have occasionally used some form of physical therapy, generally home methods. Aside from cholecystectomy, therefore, we feel that in the few patients who have had any treatment since dismissal from the clinic it differed little from that tried prior to operation.

Certain conditions incidental to operation may serve to relieve patients with arthritis, but usually only temporarily. The anesthetic induces general vasodilation of the joints. If there is postoperative fever, the benefits of vasodilation are prolonged and heat is augmented. Rest in bed relieves joints of all trauma and the postoperative dietary regulation may provide additional benefit. For these reasons some might consider the benefit subsequent to cholecystectomy as the nonspecific effect of any operation. On these grounds the reported results of certain major surgical procedures for arthritis have been frequently minimized. These factors may play a part, but their effects are usually rather immediate and transient. If relief was not noted for several months after operation and then only after persistent postoperative treatment, we have given no credit to the operation. In other cases we feel that the alteration in the course of a long chronic and progressive arthritis previously unrelieved by treatment of varying duration and intensity, should be ascribed largely, if not entirely, to cholecystectomy.

CONCLUSIONS

Cholecystitis is coexistent with chronic infectious arthritis in a small (about 3 to 6) percentage of cases. In some cases, cholecystitis and arthritis bear an indirect relationship, both probably arising from some other and primary focus. In some cases, the infection of the gallbladder may serve as a focus for arthritis. Our investigations indicate that the gallbladder may harbor organisms, generally streptococci, occasionally staphylococci or bacilli, which in some cases are capable of producing experimental lesions in the joints and gallbladders of animals. In other cases, bacteria from cholecystitis did not produce lesions of joints. They may never have been arthrotropic, or by long habitus therein they may have acquired monotropism, losing invasive qualities for other parts such as joints.

Results to joints following cholecystectomy for chronic infectious arthritis are variable, as illustrated in this series of cases. Of forty-six patients heard from, five have had complete relief of symptoms, the arthritis becoming entirely inactive. The arthritis of eleven patients was markedly improved and almost complete relief was obtained. Eight patients reported definite, although moderate improvement. Thus, 52 per cent of patients apparently were definitely, even highly, benefited by operation. The joints of the remaining twenty-one patients were only slightly improved, unchanged, or the arthritis progressed unaffected by operation.

When definite surgical indications for cholecystectomy are present, it is justifiable to urge surgical interference in the biliary tract, in the hope, and with the partial assurance, that the arthritis may be benefited. Further experience is necessary before one can urge cholecystectomy for arthritis when the indications for operation, aside from the arthritis, are not definite. A conservative attitude is probably desirable, yet the nature of chronic infectious arthritis is so malicious that a radical attitude in individual instances may be justified, provided operation is advocated and accepted without unwarranted promise of benefit.

Note: Since this paper was presented a paper by E. F. Hartung and Otto Steinbrocker on the relationship of infection of the gallbladder to arthritis has appeared (Am. Jour. Med. Sc., 184: 711-716 (Nov.) 1932). In their series of 200 cases of chronic rheumatic diseases the incidence of infection of the gallbladder (4.5 per cent) approximates that of ours. They believe that the incidence is no higher than in any general group of patients admitted to hospital, and that in none of their cases was cholecystitis a definite factor in etiology. However, animal experiments were not done, and only one patient had cholecystectomy.

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MESENTERIC CYST

REPORT OF A CASE

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MESENTERIC cysts are comparatively rare, and their origin and pathological anatomy are not definitely established. About 300 cases have been reported.

Benevieni, a Florentine anatomist, reported the first case in the sixteenth century, as an anatomical curiosity. No further study was made in reference to the significance of these cysts until within the past forty years, when systematic clinical studies have been undertaken. Dawd in 1900, in a very extensive and scholarly paper, proposes the following classification of retroperitoneal cysts: (1) embryonic; (2) hydatid; (3) cystic malignant diseases. To these Ayer later added: (4) cysts arising from the structures of the intestinal wall and, (5) cysts of normally placed retroperitoneal organs. This classification seems practical and includes all cysts whether originating retroperitoneally or in the serous layer of the mesentery.

The cysts described vary in size considerably. They have been found the size of an ordinary kidney bean and some are enormous, containing as much as eight quarts of fluid. Usually spherical in shape, they may assume oval, lobulated or cylindrical shapes. The walls of the cyst also vary from a thin friable sheath to a tough membrane. The contents are usually a clear, yellowish, viscid fluid, but may differ should bleeding occur within the cyst, or some degenerative process be present. They frequently form extensive adhesions to adjoining viscera. The most common site of occurrence is in the mesentery of the lower part of the ileum.

Mesenteric cysts occur nearly equally in each sex, are present from birth to old age, although they are most frequently discovered between the ages of eleven and thirty-five.

Practically symptomless, a mesenteric cyst may not be discovered until such time as the increasing size of the abdomen is noticed, when a sensation of weight, nausea and vomiting is experienced, or adhesions or the size of the cyst cause partial or complete obstruction by pressure upon the intestinal lumen. When this occurs, symptoms and the usual clinical findings of obstruction are found. Constipation frequently occurs, due to pressure of the cyst upon the wall of the

gut. Colicky pains occur, when either partial or complete obstruction is caused by impingement on the intestinal lumen. Bowel obstruction is by far the most important accident which may happen during the development of a mesenteric cyst. In our case partial obstruction gave rise to symptoms, which led to the ultimate diagnosis of the condition. The physical signs differ according to the size of the cyst, its location, adhesions and other factors. Due to lack of distinct symptoms and physical findings, definite diagnosis is seldom made until complications arise. In making a differential diagnosis, the field of possibilities includes any and all of the cysts of the abdominal organs. Where partial or complete obstruction is present and the cyst is not palpable, various other abdominal conditions may be simulated. This was well demonstrated in our case, where other symptoms such as vomiting and abdominal pain made us consider acute appendicitis. The bulging mass at the pubic region made a diverticulum of the urinary bladder or an ovarian cyst possibilities.

The treatment is surgical. Enucleation of the cyst is preferable. Where the blood supply may be destroyed by enucleation, the operation of choice is removal with partial resection of the intestine, followed by lateral anastomosis. If dense and extensive adhesions are present, preventing either of these methods, a cystostomy and drainage are done, with cauterization of the inner layers of the cyst wall.

REPORT OF CASE

On May 17, 1932, G. T., a female aged two years and eleven months, was brought to my office with the following history: She was apparently healthy until three days before, when she was taken suddenly ill with colicky pains in the abdomen. She was nauseated and vomited at two different times during the first two days of her illness. The bowel movements were scanty and hard, so she was given castor oil, following which she had several loose stools. She also had a slight cough. Her pains did subside at intervals, but recurred with about the same intensity as on the first day. There was no history of previous similar attacks.

She is the third child in the family. Her mother stated that after the child's birth it was noticed that the abdomen was unusually large, and has always remained protruding as she grew and developed. The family history was negative.

The general condition indicated a more thorough examination, and she was immediately sent to Bethesda Hospital, where the following physical findings and laboratory examinations were noted. She is a well developed child, all parts of body including lungs and heart give negative findings except the abdomen. On inspection the abdomen is protruding, and somewhat large. Over the lower region there was a prominence suggesting an over-filled urinary bladder, or possibly a distended bladder diverticulum. The mother stated that the child had not voided for several hours.

The general abdominal distention also suggested the possibility of a fairly well advanced peritonitis, or an intestinal obstruction, in spite of the fact that some bowel movements were recorded. Palpation was not entirely satisfactory. A mass could be indefinitely felt, which seemed freely movable, and extending from the epigastric region to the pelvis. There was considerable rigidity of the abdominal muscles. Rectal examination was negative. Percussion revealed a comparative flatness over the entire abodmen, except the upper epigastrium, which gave normal resonance. The temperature was 100, pulse 120, respirations 30. The bladder was catheterized and 100 c.c. of urine obtained, which when analyzed was found to have a faint trace of albumin. Then a solution of potassium bismuth tartrate was injected into the bladder, and an x-ray taken which showed the bladder normal and no diverticulum. A flat radiogram was also taken of the abdomen to show bowel distention if any, but this also was negative. The W. B. C. was 9,500 on the day of admission; twelve hours later it was 10,500.

The following day the temperature was 101, and the child's condition showed no improvement. A decision was made to do a exploratory laparotomy that day. Under ether anesthesia a right rectus incision was made, and a cyst found, which practically filled the peritoneal cavity, forcing the intestines laterally. It was attached to the lower part of the mesentery of the ileum. The bowel was stretched over the middle part of the cyst in such a manner that the lumen was partially obstructed. The cyst was freely movable and not adherent. The attachment of the cyst to the mesentery and beneath the intestine made enucleation impossible without disturbing the circulation of the bowel, so a removal with partial gut resection was done, and a side-to-side anastomosis. About five inches of intestine were resected. The girl made an uneventful recovery.

Gross pathological anatomy of the specimen was as follows: An oblong, slightly lobulated cystic mass, measuring 8 inches long, 6 inches wide, and 2.5 inches in the thickest anteroposterior diameter. Outside membrane is smooth and glistening and quite hard. It is attached to the mesentery and the posterior surface of the intestine. There is no connection between the cavity of the cyst, and the lumen of the bowel. The lumen of the bowel shows narrowing due to the encroachment of the growth. The cyst contains 1,000 c.c. of a reddish brown fluid which had no odor and no coagulum. The cyst wall was composed of fibrous tissue lined with endothelial cells. No microscopic analysis was made of the cyst fluid contents. The specimen is at the pathological department of the University of Minnesota.

I am indebted to Dr. W. Colby, for valuable suggestions and advice in connection with this case.

CASE REPORTS

DEFICIENCY DIARRHEA*

PHILIP W. BROWN, M.D.
Rochester, Minnesota

Approximately 70 per cent of the patients who come to The Mayo Clinic with the complaint of diarrhea furnish no objective signs on the basis of which their trouble can be explained. I feel that these patients deserve more thorough and logical care, and that they should not be assumed to have colitis unless actual inflammation of the colon is demonstrated by sigmoidoscopic and roentgenographic studies.

Accurate diagnosis in the presence of diarrhea and effective treatment of this large group of miserable patients is a challenge to the physician's ability in many instances. It has come to be recognized that certain cases of diarrhea can be classified as being caused by dietary deficiency, allergy, reflex intestinal irritability from a duodenal ulcer, cholecystic disease, renal insufficiency, and neurogenic and metabolic disturbances such as afflict some women who have diarrhea at the menstrual period or who have it as the outstanding symptom of exophthalmic goiter. There is also a large group of patients whose diarrhea apparently is caused by acute intercurrent infections, the so-called intestinal influenza. Thus far bacteriologic studies have been unsatisfactory, but I think many of these acute gastroenteric episodes are the result of streptococcal infection. The majority are of short duration and are self-limiting, but in some instances chronic diarrhea may persist.

Although the history constitutes the most important single step in the diagnosis of indeterminate diarrhea, yet it must be supplemented by examination of stools, sigmoidoscopic study, roentgenologic examination and often analysis of gastric content or determination of basal metabolic rate.

The following case illustrates the deficiency type of diarrhea.

REPORT OF A CASE

A housewife, aged twenty-nine years, first came to the clinic October, 1931. The conditions under which she lived were unfavorable. She complained of indigestion and intermittent attacks of diarrhea, during which she would have five or six watery stools a day. Her weight was 92 pounds (41.7 kg.). She was three months pregnant. There were 11.5 gm. of hemoglobin in each 100 c.c. of blood. Erythrocytes numbered 4,000,000 and leukocytes 7,400 in each cubic millimeter of blood. Analysis of gastric content, titrating against tenth normal sodium hydroxide, gave values for total acids of 40 and for free hydrochloric acid of 24. Urinalysis and roentgenograms of the thorax gave negative results. Further studies were prevented as the patient was unable to remain for observation. She was dismissed with instructions to eat more liberally and to take cod liver oil.

June, 1932, the patient again came to the clinic. Her baby had been born at the eighth month of pregnancy and had died in two months. The patient had not regained her strength. Ulcers in the mouth, sore tongue, and ulcers in the vagina had developed. Attacks of indigestion and diarrhea had persisted. Her weight was 87 pounds (39.5 kg.). There were 12 gm. of hemoglobin in each 100 c.c. of blood; erythrocytes numbered 3,210,000 and leukocytes 3,500 in each cubic millimeter of blood. The erythrocyte picture was that of primary anemia, but that there was little right shift of the neutrophiles. Ventriculin was given orally, and then liver extract intramuscularly, but at the end of two months the value for hemoglobin was still 11.7 gm. and erythrocytes numbered 3,380,000.

In September, 1932, the woman had had an attack of watery diarrhea for three weeks which had greatly depleted her body of fluid. The vaginitis and stomatitis were very painful. Further studies were urged but she could not remain for observation. As liberal a diet as possible, high in vitamins, was outlined and this was supplemented with yeast and cod liver oil tablets; also 60 grains (4 gm.) of calcium lactate three hours after meals were prescribed.

After about six weeks there was so little improvement that the patient finally made arrangements to remain under observation in hospital for two weeks. On admission, there were 12.6 gm. of hemoglobin in each 100 c.c. of blood, erythrocytes numbered 4,100,000 and leukocytes 9,400 in each cubic millimeter of blood. Roentgenograms of the colon after barium enema, sigmoidoscopic examination, and studies of the stools gave negative results. A rich, liberal diet high in vitamins supplemented with calcium, 75 grains (4.8 gm.) of Blaud's pills daily, and 16 to 24 minims of viosterol daily were prescribed. In addition, 100 units of parathyroid extract-Collip (Para-thor-mone-Lilly) was administered in the course of eight days. On dismissal November 29, the woman was feeling much better, her bowels were moving once daily, and the ulceration had practically healed. Her last visit to the clinic was February 24, 1933. In spite of a recent, rather severe attack of influenza her weight was then 99 pounds (45 kg.), the value for hemoglobin was 14.7 gm. and erythrocytes numbered 4,160,000 and leukocytes 4,800. Examination of the blood smears disclosed mild macrocytosis. The woman's bowels were moving once, and occasionally twice, daily, her appetite was good, and there remained only slight vaginal soreness; her mouth was normal. She was advised to continue with a liberal diet, and to take calcium, yeast, and occasional doses of viosterol.

COMMENT

There seems no question but that in the case reported a state of general deficiency had developed. As time went on, and as the patient's system suffered further as a result of pregnancy, depletion was more marked, stomatitis and vaginitis developed and diarrhea became more persistent. There was free hydrochloric acid in the gastric content, but the blood picture was strongly suggestive of primary anemia. There was not the usual response to administration of ventriculin or liver, and this led to the feeling that another line of attack should be considered. Response was indifferent, until it was possible to have complete control of the patient for even as short a time as two weeks. Since then progress has been definite but not spectacular; the patient's constitutional background, together with environmental difficulties, probably will preclude as full and complete response as otherwise should obtain.

Finally, I call attention to the fact that in spite of debilitation, of which diarrhea and stomatitis are the outstanding symptoms, this patient did not have colitis.

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota.

MIXED TUMOR OF THE PAROTID

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Saint Paul

The patient, a woman, fifty years old, first noticed a small lump under the lobe of her right ear fifteen years ago. It grew slowly for ten years, extending down into the neck and then remained stationary in size for four and one-half years. During the past six months there has been a gradual enlargement. There has been no pain or discomfort at any time.

Examination revealed a tumor the size of an egg in front and below the right ear. It is bosselated and varying in density in different regions, the upper pole being very hard, almost cartilaginous, and the lower and larger pole soft with areas having a cystic feel. The tumor extended downward at the anterior border of the sternomastoid muscle. It was fixed to the deep tissues but not adhered to skin or superficial tissues.

The long period of development, the location, the irregular surface, and the varying consistency characterized the growth as a mixed tumor of the parotid gland.

Removal was performed under ethylene anesthesia. The incision was made from the lobe of the ear downward over the tumor and parallel to the sternomastoid muscle through the skin and superficial fat. When the cervical fascia was opened the tumor was visible filling the apex of the subclavian triangle. The lower pole was easily freed by blunt dissection. The tumor was encapsulated and by dissection upward and within the capsule the entire tumor was enucleated. It was not necessary to ligate the external jugular or disturb the facial nerve.



Fig. 1. Gross specimen.



Fig. 2. Cut surface of gross specimen.

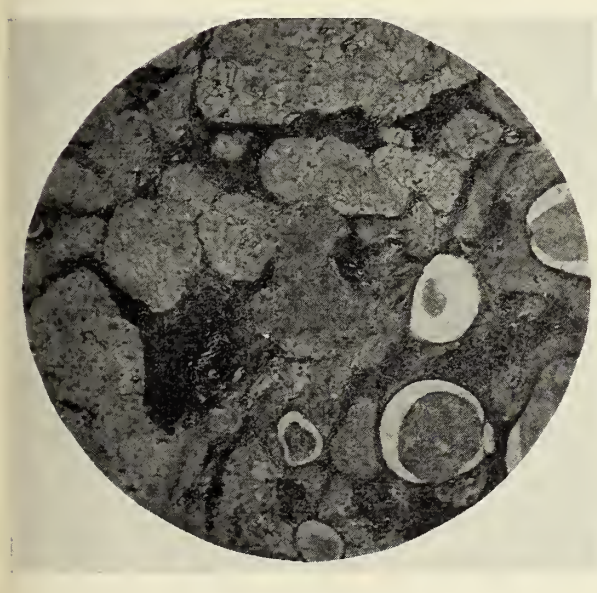


Fig. 3. Low power microphotograph showing light areas of mucoid or myxomatous tissue with embedded epithelial cells. Between these are strands and columns of rather closely arranged cells, and several cysts containing a pink, granular homogeneous substance.

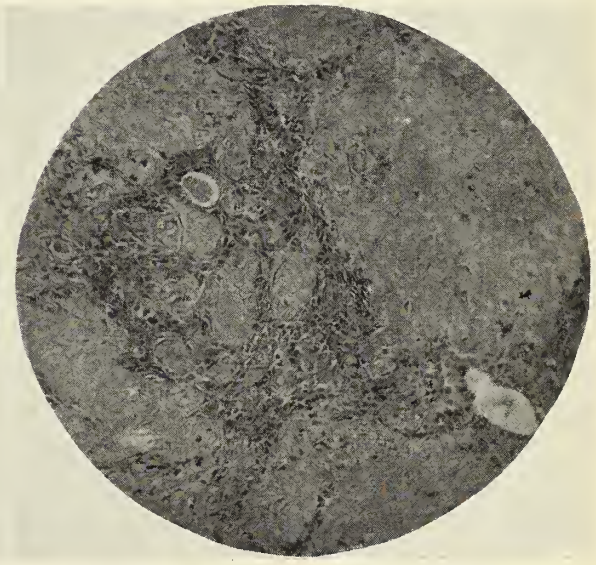


Fig. 4. High power microphotograph showing the central area consisting of closely arranged, polygonal cells with hyperchromatic nuclei. The acini are of varying size, lined by low, flattened epithelium. At the periphery, the cell masses are surrounded by a hyalin substance of myxomatous appearance with scattered epithelial cells.

GOITER CLINIC

A PRESENTATION OF TEN UNUSUAL CASES OF THYROID DISORDERS*

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It is not the purpose in the following presentation to demonstrate the ordinary features as encountered in goiter patients, but rather to illustrate some unusual situations and a few border line cases which have given more than customary difficulties in their diagnosis and treatment.

In these ten cases of thyroid disorders, it is our wish to emphasize a number of pertinent facts, but it is especially desired to show that laboratory examinations, notably basal metabolic rate determinations, are not to be used alone as criteria in deciding for or against surgical procedures, but are only adjuncts in making diagnoses and carrying out treatment. It is common for physicians in treating patients in whom the basal metabolic rate is below normal to recommend either no therapy at all, or the oral administration of thyroid extract, when as a matter of fact many patients with tracheal compression and other signs of mechanical disturbances due to enlargements of the gland, can be successfully treated by surgical measures. Likewise, patients on the border line of hypothyroidism often yield gratifying results following the oral administration of thyroid gland. It is also true that in children, determinations of the basal metabolic rates are less reliable because of differences in the ratios of body weight and body surface, so that in dealing with them this fact must be taken into consideration.

Case 1.—Parathyroid tetany following thyroidectomy for adenomatous goiter.

This patient is a woman forty years of age. Her past history as well as her family history are irrelevant. She was first seen in February, 1930, when she complained of extreme nervousness, trembling of the hands, palpitation of the heart on the slightest exertion and occasional choking sensations. These symptoms had developed during the last few months. She also stated that she had an enlarged neck since she was thirteen years of age but recently this had been noticeably increasing in size.

Examination at this time revealed the patient to be in fair general health. Her pulse rate was 82 beats per minute and the blood pressure 164 mm. of mercury systolic over 82 diastolic. The thyroid gland was enlarged rather symmetrically, each lobe measuring 8 by 6 cm. in diameter. A basal metabolic reading at this time was reported to be plus 14 per cent.

Thyroidectomy was done February 24, 1938, excising the right and left lobes but leaving the usual amount of tissue on the posterior capsule. Pathologists reported the resected specimen to be an adenomatous type of goiter.

Convalescence was uneventful except for the onset of tetany as described below, and the patient left the hospital on the sixth postoperative day.

A mild but typical parathyroid tetany developed about forty-eight hours postoperatively, which was controlled satisfactorily by large doses of calcium lactate orally. Blood calcium values at this time varied from 7 to 9 mg. per 100 c.c. and the patient got along well under this regime until in January, 1933. At this time she developed a rather severe mastoid infection necessitating surgical intervention, and since then her tetany has been so severe as to require parathormone, 20 units intramuscularly, two to three times per week, with viosterol (or cod liver oil) and calcium. Under this treatment she has again felt perfectly well, but at present still requires this drug regularly.

This case represents one in which the parathyroid glands were either inadvertently removed at operation or were destroyed post-operatively by inadequacy of their blood supply or by an inflammatory process. Calcium orally with viosterol or cod liver oil fully controlled all her symptoms until with the added demands of a severe infection parathormone was necessary for the mobilization and utilization of the calcium.

Case 2.—Resection of papillary carcinoma of the thyroid of long duration with no evidence of recurrence or metastases after one year.

This patient is a woman sixty-four years of age who was first seen in April, 1931. At that time she complained of enlargement and soreness of the neck, and dyspnea for the past four years. Her health was otherwise good and she had had no serious illnesses. On examination the enlarged thyroid gland was found to be extremely hard, irregular and cartilaginous to palpation. Each lobe was about 10 cm. in diameter but the left was found to be slightly softer and more regular to the touch. Thyroidectomy was urged but refused. The patient was not seen then until a year later when she returned for operation. In the meantime her symptoms had not changed except for the fact that a gradual increasing hoarseness had developed.

April 16, 1932, resection of the gland was done. The right lobe was found to be infiltrating the surrounding structures including the thyroid capsule, right jugular vein, right recurrent laryngeal nerve and right inferior thyroid artery. The mass projected for a distance of 4 to 5 cm. below the right sternoclavicular joint. The entire tumor was removed along with the posterior capsule of the gland and attached structures. The left lobe contained only two small adenomata and this side was not molested. Convalescence was normal and the patient left the hospital six days after the operation. Examination of the excised tissue showed a papillary type of carcinoma of the thyroid gland typical both in gross and microscopic appearance.

Since her operation this patient has remained free of all signs of recurrence of the malignancy. Hoarseness has been present due to resection of the recurrent laryngeal nerve on the right side, but it has improved considerably since the operation. No roentgenograms have been made of the chest but at present there are no signs of mediastinal enlargement or pulmonary metastases.

This case illustrates the slow growing nature of many malignant tumors of the thyroid gland. A whole year elapsed after the first examination to the time of surgical removal, and even then the tumor was probably present long before her first examination.

The prognosis should be excellent inasmuch as a year has elapsed without signs of recurrence or metastases.

Case 3.—Idiopathic myxedema controlled by thyroid extract.

This patient is a woman forty-eight years of age. She was first seen in 1917, when her main complaint was excessive bleeding from the uterus at the time of her menstrual periods. This had been present for several years, finally becoming so severe as to require hospitalization for two months, and eventually necessitating a transfusion of 500 c.c. of blood. Curettage and even hysterectomy was advised by attending physicians but refused by the patient. Additional features found on examination at this time were puffiness of the eyelids, markedly dry skin, coarse scanty hair, and swollen ankles. She stated that she felt like sleeping most of the time and that she was quite weak. A basal metabolic rate at this time was minus 28 per cent and a diagnosis of myxedema was made. Thyroid extract was given daily and immediate improvement in her condition was noted. Her menorrhagia ceased, her skin

*Presented before The Hennepin County Medical Society, April 26, 1933.

became moist again and the puffiness of the eyes, hands and feet disappeared.

Since that time she has gotten along well as long as she continues to take a maintenance dose of thyroid extract. If for any reason this is discontinued, her former symptoms immediately reappear. January, 1930, an old postoperative abdominal hernia was repaired with excellent results. The wound healed promptly and convalescence was normal.

For demonstration purposes, thyroid extract was discontinued three weeks ago. Until then she was active, possessed her usual strength, and there were no symptoms suggesting myxedema. The hemoglobin concentration was found to be 78 per cent by the Dare method, and basal metabolic rate to be minus 21 per cent. After three weeks without thyroid extract she presented the typical picture of myxedema with features of anemia, edema, sluggishness, and so forth and her basal metabolic rate was found to be minus 36 per cent (April 26, 1933).

The etiology of the disease in this patient is obscure. Until her first pregnancy twenty-four years ago she states that she had no evidence of thyroid dysfunction but soon after delivery of a normal child the symptoms described above appeared. She gives no definite history of thyroiditis, although this must be strongly considered a possible cause of the condition, and could account for the complete destruction of the thyroid gland at this time. It is interesting to note that the patient's two daughters aged 21 and 24 years both have small adenomatous thyroids but without evidence of toxicity. The patient herself gives no history of enlarged gland at any time in her life. Her symptoms are all controlled by adequate doses of thyroid extract.

Case 4.—Woody thyroiditis, or Riedel's struma.

This patient is a woman fifty-seven years of age who was first seen in August, 1930. Her complaints dated back to 1925 but they had been especially noticeable six months prior to this time. She was becoming progressively weaker, and her weight dropped from 192 pounds to 158 pounds in several months' time. Her hands and feet were numb, she had severe headaches, there was an aggravating cough, and she was quite dyspneic on exertion. Her neck had been enlarging for some time, although she had known of the presence of a goiter for twenty years or more. In 1922 she was observed for a period of a year for the possibility of pulmonary tuberculosis but this diagnosis could never be supported by roentgenographic evidence.

On examination she showed signs of recent loss of weight, her skin was loose, dry and scaly and she was quite weak and pale in appearance. Speech was slow and deliberate. General examination was negative except for the thyroid, which was the site of a hard irregular enlargement, the mass lying mostly on the right and measuring 8 by 5 cm. in diameter. The tumor was movable and manipulation of it caused spells of coughing.

The basal metabolic rate was found to be minus 26 per cent, blood pressure 146 systolic and 86 diastolic, and the pulse, temperature and respirations within normal limits. Urinalysis and blood examination were reported as normal. Roentgenograms of the neck showed no calcification in the thyroid area and similar pictures of the chest gave negative findings.

Thyroidectomy was done August 28, 1930, and the entire gland was removed because of the pathologist's report from a frozen section of the mass, of a probable carcinoma. Convalescence was normal. On section of the removed specimen, the cut surface presented a homogeneous white appearance and its substance was very hard. Microscopically the thyroid tissue itself was found to be almost completely obliterated due to a heavy infiltration of round cells. There were a few areas in which distorted masses of cells were found. After study of specimens fixed in formalin, pathologic diagnosis by Dr. Bell at the University of Minnesota was woody thyroiditis. There was no evidence of tuberculosis or carcinoma. Due to the total removal of the gland, thyroid gland was administered immediately by mouth and the patient has developed no signs of myxedema.

Six weeks postoperatively determination of the basal metabolic rate showed it to be plus 18 per cent and since then has dropped as low as minus 14 per cent. On April 7, 1933, it was minus 3 per cent. This patient feels well, she carries on her household duties without any trouble and in general is an essentially normal woman as long as she continues to take thyroid gland. At present she takes five grains of the fresh gland daily.

In this case a postoperative myxedema was produced which has been controlled satisfactorily by the use of thyroid extract. At the time of operation no attempt was made to preserve thyroid tissue because of the possibility of malignancy, so that hypothyroidism in this case seems justifiable. It would no doubt have resulted in any event, because of the complete destruction of thyroid tissue by the inflammatory process.

Case 5.—Recurrent exophthalmic goiter in a child following ligation of all four arteries to the gland and thyroidectomy.

This girl first came for treatment of her goiter in April, 1929, when she was thirteen years of age. For a year or so prior to this time she had noticed a gradual symmetrical enlargement of her neck, and concomitant with this enlargement the typical signs and symptoms of a toxic goiter appeared. She began to lose weight in spite of a voracious appetite, her heart beat more rapidly than usual, she noticed cardiac palpitation, she tired very easily, and she soon became extremely nervous. Examination at this time supported a diagnosis of exophthalmic type of hyperthyroidism. She appeared markedly stimulated, there was a slight exophthalmos present and there was a diffuse enlargement of each lobe of the thyroid. The pulse rate at this time was 128 beats per minute. Basal metabolic rate was found to be plus 28 per cent. After a few days of preparation, in which time compound solution of iodine was given orally along with sedatives, ligation of both superior poles of the thyroid gland was done under ethylene anesthesia. Recovery was rapid and improvement in her condition was noted to the extent that six days later it was considered feasible to subtotally resect the thyroid gland, preceded by ligation of the inferior thyroid arteries. Convalescence was essentially normal. Since the operation she improved for a time but within the last year her former symptoms have all returned. Her basal metabolic rate at present (April 26, 1933) is plus 30 per cent, her pulse rate 120 beats per minute and in general she presents the typical picture of exophthalmic goiter. However, one factor in this girl's condition must not be overlooked, and that is the fact that she has continued to gain weight in spite of her other symptoms. This may be possibly due to the fact that other endocrine disorders than that of the thyroid are most likely present.

Case 6.—Calcified hemorrhagic suppurative adenomatous cyst with tracheal compression and deviation.

This is a man sixty-five years of age who was first seen October 18, 1932. His past history was entirely irrelevant and his health had always been exceptionally good. He had known for many years that there was a goiter "on the side" of his neck but it had never given him any symptoms so he had always disregarded it. In July, 1928, he began to notice a rather rapid enlargement of a mass in the anterior portion of his neck. It gave him no pain but it continued to grow in spite of various types of local treatment. He began to get hoarse soon after the onset of the present trouble and

has continued to be so ever since. Physical examination was essentially negative except for a mass on the right anterior portion of the neck measuring 8 cm. by 10 cm. in diameter. It was movable, tense and semifluctant, but not tender. Laboratory examinations including basal metabolic rate determinations were found to be within normal limits. An antero-posterior roentgenogram of the neck and chest showed a large calcified cyst of the thyroid which was displacing the trachea to the right side.

October 24, 1932, this cyst was excised along with several small adenomata in the thyroid gland itself. Grossly the cyst measured 10 by 8 by 6 cm. and was encapsulated by a thick, chronically inflamed, calcified wall. The contents consisted of purulent fluid containing cholesterin and necrotic glandular renmants. Microscopically there was a great deal of chronic inflammation in the removed portions of the gland as well as throughout the cyst wall. Convalescence was normal except for the fact that the wound drained a small amount of purulent exudate for a period of four weeks. He has remained in excellent health since, there has been no recurrence of the mass in the neck, and his hoarseness has completely disappeared.

In this case it is probable that the contents of an old adenomatous cystic mass in the thyroid became infected and then distended with pus, enlarging the mass to the extent of displacing the trachea laterally and compressing the recurrent laryngeal nerve. Infection readily spread from the cystic mass to the adenomatous as well as to the normal portion of the gland.

Case 7.—Massive hemorrhage into an adenomatous cyst with signs of tracheal and laryngeal nerve compression.

This patient is a woman of forty-five, who came for examination January 10, 1933. She had known that she had an enlarged thyroid gland for some years but it never had given any symptoms until one week prior to her examination. At that time she noticed a sudden, large swelling of the left side of the neck and there appeared immediately in this area a mass about 10 cm. in diameter. Associated with the appearance of this mass she suffered a great deal of pain along with a sense of suffocation and dyspnea, but in about a week or ten days both the tumor and the pain gradually receded to a certain degree. Hoarseness of a mild character was present throughout this time.

General physical examination showed an essentially normal healthy female except for a hard round tender fluctant mass in the left lobe of the thyroid gland measuring 8 cm. in diameter. No other masses were palpable in the gland at this time. Laboratory examinations including a determination of the basal metabolic rate were reported as within normal limits.

January 14, 1933, under ethylene anesthesia this cyst was enucleated. About half of the left lobe of the gland was likewise removed because of the presence of several small adenomata.

The patient left the hospital after a normal convalescence in six days and has remained in excellent health since that time. Her hoarseness has been gradually decreased and at the present time has almost completely disappeared.

Pathologists reported the specimen to be an adenomatous cyst filled with blood due to a recent hemorrhage, and measuring 8 by 8 by 6 cm.

This case represents one in which a sudden rapid large hemorrhage took place into a preëxisting adenomatous cyst. The etiology of this hemorrhage was probably not traumatic but more likely due to erosion of a fairly large vessel in the growing adenomatous cyst. The extent of the hemorrhage must have been large because of the pain, dyspnea and hoarseness which were produced.

Case 8.—Exophthalmos in the absence of other signs of toxicity coming on three years following thyroidectomy for exophthalmic goiter.

A woman forty-three years of age came for examination in May, 1932. Her past history as well as her family history were irrelevant. She had a thyroidectomy in October, 1928, elsewhere for exophthalmic goiter, following which she recovere dher normal health for three years. Her eyes prior to this operation were markedly exophthalmic but they receded and appeared entirely normal within six weeks after the removal of the thyroid gland. She was then well until the fall of 1931, when she began to have recurrence of her exophthalmos, first in the left eye but soon followed by that in the right, and this was not accompanied by any other signs of hyperthyroidism. Her weight remained normal, she was not nervous, her pulse was not elevated and her general health continued to be excellent.

Physical examination in May, 1932, showed essentially a normally healthy woman but with extremely marked exophthalmos on both sides. The eyes were reddened and the conjunctiva were rather severely inflamed, but her vision was fairly good. No thyroid gland tissue could be palpated. A basal metabolic rate was reported minus 6 per cent. Ligation of the inferior thyroid arteries was performed May 27, 1932, following which the condition of her eyes improved. They became definitely less prominent, vision subjectively was better and she noticed that the inflammation in the conjunctiva gradually and completely subsided.

At present she still has slight exophthalmos but it is only of a mild degree and is not accompanied by conjunctivitis. Her basal metabolic rate was determined April 26, 1933, was found to be minus 3 per cent and her health is in general very good.

The cause of the recurrence of exophthalmos in the absence of other signs of toxicity in this case is obscure, although it is no doubt definitely related to an endocrine disturbance resulting from her previous hyperthyroidism. Although thyroidectomy brought on apparent cure lasting three years, other disturbances of the endocrine system affecting only the exophthalmos have produced this picture. It is interesting to note that ligation of the inferior thyroid arteries has brought about definite improvement in her condition. Whether this was due to interruption to the blood supply or to some change in nerve impulses to the gland is purely theoretical. At any rate there has been improvement.

Case 9.—Persistent exophthalmos appearing after thyroidectomy affecting each side alternately but without other evidence of hyperthyroidism.

This patient is a man, forty-seven years of age, who first became ill in February, 1927. At this time he lost thirty-five pounds in weight within five weeks, he was nauseated a great deal and he frequently vomited. His general strength rapidly decreased and he was soon unable to do any work. He had been treated unsatisfactorily for diabetes mellitus for the preceding months.

On examination he was found to be fairly well nourished in spite of his rapid weight loss. His pulse varied from 90 to 100 beats per minute and his blood pressure was found to be 104 millimeters of mercury systolic over 62 diastolic. There was no exophthalmos nor other eye signs of hyperthyroidism at this time. The thyroid gland was not appreciably enlarged and no nodules were present in it. A marked tremor of the fingers as well as a decided weakness of the quadriceps group of muscles was noted. Basal metabolic rate at this time was plus 36 per cent, but after a period of ten days on Lugol's solution it fell to plus 10 per cent.

Thyroidectomy was done on March, 1928, and examination of the tissue removed disclosed a typical exophthalmic type of goiter. Convalescence was uneventful, he rapidly recovered his usual weight and strength, and for the next year he was perfectly well. However,

twenty-seven months postoperatively he noticed that his right eye was gradually becoming more and more prominent, but during this time the left eye remained normal. In the prominent eye his vision was very poor and there was a marked degree of conjunctival inflammation, but no ulcers were present. The right eye continued to protrude for about six months, when for no apparent reason it began to recede, and concomitant with this recedence of the right eye exophthlamos began to appear in the left eye. Since that time the left eye has remained very prominent, but recently it has started to recede somewhat. About this time the right eye began to become markedly exophthalmic and at present this is the more prominent of the two. His health has otherwise been fairly good although he says he is not up to par physically. His weight is normal and he has no complaints except of his eyes.

Examination at the present time is essentially negative except for an exophthalmos on both sides, which is decidedly more marked on the right. The basal metabolic rate was found to be minus 14 per cent (April 26, 1933).

The interesting feature in this case is an alternating exophthalmos affecting both eyes which came on after thyroidectomy and which had persisted in spite of total absence of other signs of hyperthyroidism. Certainly an endocrine dysfunction is responsible for the sequence of events. Therapy has been entirely without benefit in regard to the eyes.

Case 10.—Recurrence of exophthalmic goiter after thyroidectomy and subsequent to bilateral oophorectomy.

This patient is a woman twenty-seven years of age. She has been married ten years and has two children. Her appendix and right ovary were removed in 1924 and in 1926 a left tubal pregnancy involving the left ovary was resected. She made normal recoveries from both of these operations.

Soon after the last operation she first became conscious of rapid heart beat, tremor of the fingers, protrusion of the eyes, excessive perspiration, progressive loss of weight, etc. Subtotal thyroidectomy was done elsewhere in 1927 and convalescence was essentially normal. Her symptoms did not at any time completely disappear after this operation, although she did feel a great deal better. Within the past year there has been a definite recurrence of all her former symptoms with even a greater severity than those previously described. She was first seen November 5, 1932, and at this time presented the typical picture of a severe exophthalmic goiter. A determination of the basal metabolic rate was found to be plus 62 per cent.

After several days of preparation using compound solution of iodine, sedatives and rest in bed, in which time the basal metabolic rate dropped to plus 32 per cent, operation was done November 11, 1932. The inferior thyroid arteries were first ligated extrafascially on each side and the gland itself then exposed. The right lobe was about normal in size and this was not molested but the left lobe, which was enlarged to about 5 cm. in diameter, was subtotally resected, leaving only a thin layer on the posterior capsule. Convalescence was rather stormy the first few days due to a mild crisis, but in ten days the patient left the hospital and since then has continued to improve. At present she is still mildly toxic as evidenced by a basal metabolic rate of plus 22 per cent.

In this case all thyroid tissue has been removed but hyperthyroidism still persists. It is questionable how much influence the absence of both ovaries has played in producing the chain of symptoms described. Treatment at present is limited to sedatives and rest, but it may be considered advisable in the future to religate all four arteries should the signs of toxicity persist.

1737 MEDICAL ARTS BUILDING.

METASTATIC CARCINOMA OF TRICUSPID VALVE*

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A perusal of the literature indicates that metastatic carcinoma of the heart is even more rare than metastatic sarcoma. Nicholls[4] has collected a large series of case reports, and has tabulated them as follows:

Authors	Carcinoma Autopsies	Heart Metastases
Blumensohn	1078	34
Chambers	2161	7
Willigk	4547	9
Kohler	9118	6
Pic and Bret	1708	25
Thoreli	3000	6
Bryant	2942	6
Tadson	8289	6
Peters and Milne	1976	3
Ely	2161	7
	36,980	109

There is considerable noticeable variation in the incidence of heart involvement but the average for Nicholls' series[4] was .32 per cent.

Upon analyzing these reports it was evident that in most of the cases the involvement of the heart was the result of direct extension from neighboring structures, such as lungs, peribronchial lymph nodes, thyroid, thymus, esophagus and mediastinum. Hamilton[2] recently reported extensive involvement of the myocardium secondary to a carcinoma in the left bronchus, producing surprisingly few clinical symptoms.

It seems to be unusual for carcinomatous cells floating free in the blood stream to either enter the coronary arteries or implant themselves on the surface of the endocardium. However, this does occur occasionally, and the following cases, in addition to my own, illustrate the fact.

Nicholls[4] has reported three cases, all with secondary carcinoma implanted on the anterior wall of the right ventricle near the tricuspid valve, the orifice being partly obstructed in two instances. There was no infiltration into the heart muscle in one case. None showed implantation on the valve cusps. The primary lesion was only mentioned in one instance, that being an adenocarcinoma of the stomach.

A definite case of secondary or metastatic implantation of carcinomatous cells on the endocardium of the right auricle has been reported by Ragle.[6]

Kanthack and Pigg[3] described a metastatic carcinoma of the tricuspid valve with the primary lesion in the right testis.

Rist and Rolland[7] have reported an extensive secondary carcinomatous growth on the mural and valvular endocardium of the right ventricle in a woman of forty, the primary growth being in the uterus and pelvic lymph glands.

Free and unattached malignant masses have been found loose in the heart chambers. Osler[5] found a large free mass of sarcomatous tissue plugging the tricuspid orifice in a child. Geipel[1] found a free mass of tissue in the right heart secondary to a hypernephroma.

In my case, the implantation of the carcinomatous cells was on the posterior and left cusps of the tricuspid valve, the myocardium not being at all involved.

CASE REPORT

The case is that of a white man, seventy-one years of age.

For thirty-five years prior to his death he had been engaged in the grocery business. He had never had any serious illnesses except those usually occurring in childhood. In 1928 he awoke one morning with a com-

*Read before the meeting of the Minnesota Society of Internal Medicine, Duluth, Minnesota, June 4, 1932.

plete paralysis of the left arm, but examination proved this to be the result of pressure on the musculospiral nerve, and it cleared up rapidly within a week or ten days. At that time he went through a clinic and had a very thorough examination including x-ray of the gastro-intestinal tract and chest, and everything proved to be normal.

In April, 1930, the patient suffered from a spontaneous acute phlebitis of the left saphena magna, had some fever for four or five days, and some edema and pain in the leg. The leg was strapped and he apparently recovered completely in about four weeks.

He had been constipated all his life, finding it necessary for many years to take cathartics. Since the attack of phlebitis, he had had to increase the amount of cascara, which he had been using for many years. One teaspoonful had always sufficed, but now he had to take three or four teaspoonfuls, and often had to take a large dose of Epsom salts in addition.

In July, 1930, he fell from a step ladder and fractured two ribs. This was followed by pleurisy and pneumonia, with fever and the usual symptoms, lasting seven to ten days. After getting out of bed he did not regain his former strength, and he slowly lost in weight. He attributed all this to the fall, and consequently did not see a physician. The constipation increased. During the month of September he gained very little in strength, and continued to slowly lose in weight, although he had been resting more and eating fairly well. He found he needed more rest, and was not refreshed when he awoke in the morning. He was seen by a physician at this time, who advised a complete gastro-intestinal x-ray, but he refused. During October he continued to lose in weight and strength. His friends remarked he was becoming pale. The constipation became worse, and sometimes his bowels would not move for three or four days, and then only after a large dose of Epsom salts. Up to this time he had not seen any blood in his stools. He had no indigestion or pain at any time, except that sometimes the cathartics gave him severe abdominal cramps.

He was in the habit of eating only two meals a day, a late breakfast and a large dinner about 5 p. m. He soon noticed he was losing his appetite, but had no indigestion, nausea or vomiting. His symptoms continued to increase in severity up to December 9, when he began to feel very ill, his bowels not having moved for five days in spite of using numerous cathartics. He finally took a huge dose of Epsom salts on this day, and during the night was awakened by severe pain in the abdomen. Shortly after this he had a very large stool. His bowels continued to move for some time, and he seemed to grow very weak. Finally everything got dark before his eyes and he became unconscious. He found himself lying on the floor some time later, and managed to crawl back into bed. He did not flush the toilet and upon examination the next morning he noticed a large amount of blood.

He called his physician at this time, who removed him at once to Fairview Hospital, where he continued to grow weaker very rapidly until his death on December 29. During his stay at the hospital his bowels continued to be somewhat loose, and all stools contained microscopic and chemical blood. There were no more profuse hemorrhages. He never vomited and had no indigestion although he ate quite well up to one week before his death. He had very little or no pain, except occasionally when the abdomen became distended, and this was relieved by enemas.

The chief points of interest on physical examination were the abdomen, heart and lungs. Palpation of the abdomen revealed slight tenderness in the upper left quadrant, with an indefinite fullness here, but no definite mass to be made out. The fact that physical examination of the heart showed nothing abnormal is interesting in view of the post-mortem findings. The lungs showed evidence of congestion in the lower right lobe with a thin layer of fluid over it, which gradually increased in amount up to the time of his death. Physical examination was otherwise negative, except for a pale skin and mucous membranes with evidence of recent loss in weight. His temperature varied between 98 and 101; pulse between 96 and 120.

Blood examination on December 11, 1930, showed r.b.c. 2,590,000, hemoglobin 64 per cent, w.b.c. 17,600, which findings remained practically unchanged. The blood urea was 21.4 mg. per 100 c.c. of blood on one occasion.

Aside from a trace of acetone and diacetic acid the urine was normal.

The electrocardiogram was normal.

X-ray of the lungs on December 12 showed mottling in the lower half of the right lung with a uniform haze near the base, suggesting fluid or thickened pleura. X-ray of the colon showed a dilatation of the splenic flexure, with narrowing of the adjacent transverse colon, and an irregularity of the distal end of the transverse colon. The transverse colon was never found to be well filled, and there was a definite delay in emptying of the motor meal. Fluoroscopic and x-ray examinations of the stomach were unsatisfactory as it was impossible to get the patient to drink enough barium to fill the stomach well. The x-ray diagnosis was: Malignant growth, possibly involving the transverse colon.

The clinical diagnosis was: (1) Carcinoma of the transverse colon near the splenic flexor; (2) terminal broncho-pneumonia; (3) post-hemorrhagic secondary anemia.

Dr. George Douglas Head saw the patient in consultation and made a diagnosis of carcinoma somewhere in the gastro-intestinal tract. He was not convinced it involved the transverse colon.

Post-mortem examination was made by Dr. Ralph E. Miller, Pathologist at the University of Minnesota, and the findings were as follows:

"The peritoneal cavity contains 50 c.c. of clear, straw-colored fluid. There are fibrous adhesions about the splenic flexure of the colon which bind it firmly to the spleen and which bind the spleen to the diaphragm and omentum. The appendix is bound to the cecum by fibrous bands. The right diaphragm arches to the fourth interspace, the left to the fifth rib.

"The left pleural cavity is obliterated by fibrous adhesions. The right apex is adherent by fibrous adhesions. The right cavity contains 1,000 c.c. of slightly blood-tinged fluid. The pericardial sac contains 50 c.c. of clear, straw-colored fluid.

"The heart weighs 400 grams. It is pale brown and of decreased consistence. As the right auricle is opened the auriculoventricular orifice is seen to be filled by a firm yellowish nodular cauliflowerlike mass which is adherent to the posterior cusp and to the left cusp. On section this mass is seen to contain mucoid areas (Fig. 1). The left ventricle is dilated, grade 2. Otherwise the endocardium and valves appear normal. The root of the aorta is very slightly sclerotic.

"The right lung weighs 800 grams and there is at the base of the lower lobe a firm raised dark red area 8×7 cm. The consistency of the lower lobe generally is increased, grade 1; crepitus decreased, grade 1. The cut surface generally exudes a slightly cloudy fluid. The raised portion is seen to be continuous with a triangular dark red firm region extending toward the hilus. The left lung weighs 700 grams. The lower and upper lobes are edematous.

"The liver weighs 2,100 grams. Its surface is irregularly nodular. Its consistence is increased, grade 3. It is pale brown in color. The cut surface is marked by anastomosing light colored bands which surround pale lobules of liver substance. The gallbladder contains 40 c.c. of pale bile; otherwise it appears normal.

"The esophagus appears normal except for a small nodule beneath the epithelium, measuring 2 cm. in diam-

eter, which is situated 14 cm. above the cardiac orifice. The stomach contains 300 c.c. of black viscid fluid. There is a cauliflower soft mass on the posterior surface, 10 cm. in diameter, extending into the lumen of the stomach for a distance of 3 cm. Many blood clots are adherent to this mass. The small intestine contains approximately 500 c.c. of black material. The colon contains 100 c.c. of tarry substance, but otherwise the small intestine and colon appear normal.

"The aorta shows sclerosis, grade 1. The thymus appears normal. Head is not examined. Otherwise the findings were normal."

The pathological diagnosis was: (1) carcinoma of the stomach with metastasis to the tricuspid valve; (2) hemorrhage into the gastro-intestinal tract; (3) infarction of the lung with bronchopneumonia; (4) hydrothorax, right, 1,000 c.c.; (5) cirrhosis of the liver; (6) leiomyoma of the esophagus.

COMMENT

The clinical picture and incomplete x-ray findings pointed to carcinoma of the colon, while the primary lesion was on the posterior wall of the stomach, where it is easily missed unless a careful x-ray study is made. This was impossible, however, in this case because of the lack of coöperation on the part of the patient. Marked fibrous adhesions found at the splenic flexure of the colon can account for the clinical and x-ray findings here.

Clinical examination of the heart, including electrocardiogram and x-rays, showed it to be entirely normal, yet there was a large metastatic carcinoma of the tricuspid valve (Fig. 1). It was somewhat of a surprise to me to find such a large lesion and still no clinical evidence of its presence, or any apparent embarrassment of the heart function. Blood-borne metastases from this mass to other parts of the body would seem quite possible, but none was found. It is possible the infarct in the lung may have been produced by an embolus from this mass, but no carcinoma was found there.

It seems evident from this case, and others reported in the literature, that metastatic carcinoma of the heart, even though quite extensive, does not interfere much with the function of the heart, and produces only slight clinical symptoms, if any. This is especially true of those cases where entrance to the heart has been by implantation on the endocardium. Death is almost always due to the effects of the primary lesion.

CONCLUSION

1. Metastatic carcinoma of the heart is rare, even more so than secondary sarcoma.
2. Most of the cases are the result of direct extension from a neighboring structure.
3. Occasionally the free carcinomatous cells in the blood stream become implanted on the mural or valvular endocardium.
4. Clinical symptoms or impairment of heart function are slight compared to the extent of involvement of the valves and myocardium. The diagnosis is usually made post-mortem.



Fig. 1. Metastatic carcinoma involving tricuspid valve.

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MISCELLANEOUS

COURSE FOR MEDICAL RESERVE OFFICERS

The medico-military course of inactive duty training for Medical Department Reserve officers, which has been held at the Mayo Clinic during the past four years, will again be held this year from October 1 to 14, both dates, inclusive. This inactive duty training will follow the plan so well worked out under the auspices of Colonel George A. Skinner and the military features will be under his personal supervision.

This type of military medical training is now well established and has proved its worth during the past four years. The course offers valuable and interesting training for the Medical Department officers of all the components of our national defense. The staff and faculty of the Mayo Clinic have again placed their unexcelled facilities at the service of their government in the interest of preparedness, and have extended an invitation to all the services to participate.

This short course is equally applicable to general practitioners and specialists. The morning hours are devoted to purely professional subjects selected by the student officers. The afternoon hours pertain solely to medico-military subjects and the evening hours are covered in a lyceum course of general interest.

Application for this course of inactive duty training should be made to the Corps Area Surgeon, Seventh Corps Area, Omaha, Nebraska. Applications should state the character of the work the candidates desire to follow in the morning hours. All student officers are expected to attend and participate in the afternoon and evening sessions. Each applicant should fully understand that the invitation to accept this course of study without charge is extended by the Mayo Clinic; that the project is without expense to the Government; and that one hundred hours' credit will be given those who take and complete the course. While it is desirable to attend the entire course, those whose time will not permit this may join or leave at any time and will receive credit for the hours spent in training. Uniforms are optional.

CULTURE

But there is a still greater sacrifice which many of us make, heedlessly and thoughtlessly forgetting that "Man does not live by bread olone." One cannot practice medicine alone and practice it early and late, as so many of us have to do, and hope to escape the malign influence of a routine life. The incessant concentration of thought upon one subject, however interesting, tethers a man's mind in a narrow field. The practitioner needs culture as well as learning. The earliest picture we have in literature of a scientific physician, in our sense of the term, is of a cultured Greek gentleman; and I care not whether the young man labors among the beautiful homes on Sherbrooke Street, or in slums of Caughnawauga, or in some sparsely settled country district, he cannot afford to have learning only. In no profession does culture count for so much as in medicine, and no man needs it more than the general practitioner, working among all sorts and conditions of men, many of whom are influenced quite as much by his general ability, which they can appreciate, as by his learning, of which they have no measure. The day has passed for the "practiser of physic" to be like Mr. Robert Levet, Dr. Johnson's friend, "obscurely wise and coarsely kind." The wider and freer a man's general education the better practitioner is he likely to be, particularly among the higher classes, to whom the reassurance and sympathy of a cultivated gentleman of the type of Eryximachus may mean much more than pills and potions. But what of the men of the type of Mr. Robert Levet, or "Ole Docteur Fiset," whose virtues walk a narrow round, the men who do the hard general practices in the poorer districts of the large cities, in the factory towns and in the widely scattered agricultural regions—what, I hear you say, has culture to do with them? Everything! It is the bichloride which may prevent the infection and keep a man sweet and whole amid the most debasing surroundings. Of very little direct value to him in his practice—though the poor have a pretty keen appreciation of a gentleman—it may serve to prevent the degeneration so apt to overtake the over-worked practitioner, whose nature is only too prone to be subdued like the dyer's hand to what it works in. If a man does not sell his soul; if he does not part with his birthright of independence for a mess of pottage to the Ishmaelites who harass our borders with their clubs, and oppress us with their exactions; if he can only keep free, the conditions of practice are nowhere incompatible with St. Paul's noble Christian or Aristotle's true gentleman. (Sir Thomas Browne.)—Counsels and Ideals from the Writings of William Osler.

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CORRESPONDENCE

WHITHER ARE WE GOING?

At the Monday evening medical economics session of the State Medical Association meeting held at Rochester, Dr. Morris Fishbein spoke most interestingly and instructively on the trend of medical practice. This was a very pertinent subject. May we present another for your consideration?

After having held various offices within the ranks of organized medicine in this state and taken active part in various other medical activities, we too have noted a change in the trend of medical affairs within our own state organization. We have had the temerity to state on various occasions that in our humble opinion the time was not far distant when we would continue to carry on our business affairs and maintain our legal and political activities through our officers and that the pursuit of medical science and the staging of our annual medical program would be delegated to the various truly medical organizations of the state. The same might be said of our national organization but on a larger scale. Joint sessions for the discussion of economic and medical subjects of general interest and the table demonstrations would still be carried on.

Upon analysis we find that this is precisely what took place at the recent Rochester meeting. The scientific program was staged by the various medical societies of the state while our state officers devoted their time and energy to our business affairs, and were only conspicuous in the meetings of the House of Delegates, the Councilors and the medical economics meetings. Not a single state officer as such presided at a scientific meeting. Officers of the various medical societies occupied the chair. One needs but to consult the state program to verify this.

In recent years a trifle over 6 per cent of our state dues went to defray the expenses of the annual state meeting and exactly thirty-three and one-third went to meet the expenses of the state legislative committee. In 1931 the latter figure went as high as 46 per cent and in 1929 it went to almost 60 per cent. However, in the last four years we have spent over five times as much on our legislative program as we have on the annual meeting. The insistence on secrecy concerning these huge expenditures is giving rise to a feeling of disgust.

So, perhaps there is more than a trifle of justification for the comment that the officers of our state association have apparently lessened their energy in the pursuit of scientific medical problems and have devoted more of their time and spent too much of our money in the purely business and political affairs of our organization.

Perhaps this is as it should be. Perhaps we should encourage our politically minded members who feel unhappy and like a fish out of water in other fields of laudable activity to concentrate, with definite prescribed limitations, on this feature of our organization and place our scientific medical affairs in the hands of the various medical societies of our state, of which there is a sufficient number. This no doubt would result in mutual benefit. We certainly are in a position to finance a medical meeting which would be second to none.

Some persons have criticized the mediocrity of the Rochester program. This is unfair as this meeting was planned as an innovation and a decided departure from the older type of meetings; in fact it was pronounced as an experiment and intended as such, but the plan offers many possibilities.

The present status of the delegates also calls for comment. The delegate is supposed to represent his county society in the House of Delegates where our state business is transacted but his opportunity for real constructive work and initiative is getting less and less. He finds himself helpless as a yes yes man all wound round with the woolen string of prearranged affairs. All committee reports are predigested by an appointed Reference Committee which offers its own recommendations and it is the report of the latter committee rather than that of the former that is put to a vote. All annual elections to the important offices are arranged long in advance, months if not years, by the powers that be. The presidency for years past has been handed out as a more or less political present or bestowed as a token of appreciation for organization services.

If perchance something of apparent importance is unexpectedly brought up on the floor of the House of Delegates it is immediately referred to the Council, which is a more or less self perpetuating body which has the status of a Finance Committee and serves as the business body when the House of Delegates is not in session. New amendments to the state constitution recently adopted makes the out-going president a member of the Council and *all* past presidents members of the House of Delegates. Of course the latter cannot hold office nor have they a vote but their voice in the House tends to minimize the influence of the delegates.

The poor delegate finds himself assigned to an ever increasing field of nothingness. Another amendment adopted makes the President and the Secretary of the State Association members of all committees.

One might almost suggest the complete abolition of the House of Delegates if it were not for the fact that this move would rob the medical tax payer of his only remaining contact for direct representation.

The charter members of our organization had intended the pursuit of scientific medical problems as the aim of the Association. Recently we awoke to our business and economic relationships, which was right and proper, but are we not in danger of letting the pendulum swing too far in that direction, and degenerate into a political organization with a medical past history? Think this over.

A. G. Schulze, St. Paul, Minn.

Editor's Note: Above appears a communication received shortly after our last annual meeting, entitled "Whither Are We Going?" The author makes some observations on the trend of State Association affairs, and especially of our state medical meetings. The entire subject is a large one and it is to be expected that there can be no universal agreement. That someone is thinking seriously about the Association is a healthy sign and Minnesota Medicine is a fitting place to air his views.

ANOTHER FRAUD

Recently there came to my office a man calling himself Henry R. Jordan, claiming to be a representative of the Meredith Publishing Company, Des Moines, Iowa, publishers of *Successful Farming,* etc.

Mr. Jordan explained that his company was offering to farmer-subscribers a free accident insurance policy, and that he was authorized to appoint in each community one physician and one dentist, to whom should be referred all persons claiming benefits under this policy; that no claims were to be paid unless the policy holder were treated by the appointed doctor.

The scheme was to induce the appointed doctor to subscribe for the magazine at a price of $2.00 for five years, the magazine to be free after the five-year period.

After Mr. Jordan had left, becoming suspicious of the scheme he proposed, I wrote the Meredith Publishing Company to inquire whether they had such a representative and whether he was authorized to make any such proposition. The answer was negative to both questions.

Perhaps the publication of this information may save someone from being victimized.

C. L. Farabaugh,
Owatonna, Minnesota.

CORRECTION

The title of the article by Dr. Waltman Walters, Rochester, Minnesota, which appeared in the June number of Minnesota Medicine, Vol. XVI, page 416, should have read: Transplantation of the ureters to the sigmoid colon for exstrophy of the bladder and other *urethral* abnormalities with urinary incontinence.

OF GENERAL INTEREST

Dr. C. F. Wohlrabe, who recently moved from Springfield, Minn., to Minneapolis, has opened offices at 5007 France Avenue South.

Dr. Leo C. Culligan has announced the opening of offices at 1005 Medical Arts Bldg., Minneapolis. His practice is limited to surgery.

Dr. Clarence G. Ochsner, who has just completed a two years' internship at Augustana Hospital, Chicago, has located at Wabasha, Minn.

Dr. C. H. Sherman of Oakes, N. D., was married to Miss Hila Smith of Anoka, Minn., Thursday, June 8, 1933. Dr. and Mrs. Sherman are now at home in Oakes.

Dr. Edward Emerson, Saint Paul, was married July 12, 1933, to Miss Marcia Smith of Minneapolis. Upon their return from their wedding trip Dr. and Mrs. Emerson will reside at Lakewood, White Bear, Minn.

Dr. A. C. Strachauer, Minneapolis, has returned from Seattle, where he gave a series of lectures and clinics in surgery and cancer the week of July 17 in the postgraduate course offered annually by the University of Washington.

Word has been received that Dr. H. L. Weber, missionary physician at Elat, French Cameroun, who took his internship in surgery at Stillwater, Minn., thirty years ago, has been made a member of the Legion of Honor by the French government for his services in Africa.

Dr. C. B. Wright, Minneapolis, was elected a Trustee of the American Medical Association at the annual meeting held in Milwaukee in June. Dr. Wright is the second Minnesotan to serve as Trustee, Dr. Thomas McDavitt of Saint Paul having so served for many years preceding his death.

Dr. and Mrs. Kenneth E. Fritzell are now at home at 212 Walnut Street, Southeast, Minneapolis, following their wedding trip through northern Minnesota. Mrs. Fritzell was Miss Stella Houge of Minneapolis. Dr. Fritzell is a graduate of the University of Minnesota medical school, 1930.

Dr. F. E. Harrington, Minneapolis city health commissioner, Dr. J. A. Myers, of the Lymanhurst staff, Minneapolis, and Dr. C. A. Stewart, of the University of Minnesota hospital staff, participated in a health institute conducted in June at the University of Michigan, Ann Arbor, under the auspices of the American Child Health Association.

« A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION »

Radio Quacks

AMONG the many important resolutions adopted by the House of Delegates at the Milwaukee meeting of the American Medical Association, was one on radio broadcasting which is particularly interesting to Minnesota physicians.

This resolution as drawn by Dr. Carl F. Moll of Michigan and amended by Dr. Holman Taylor of Texas recommended:

"That the Board of Trustees, through the Bureau of Investigation and through such other national organizations as the Board may be able to enlist, initiate and pursue activities and efforts to terminate misleading and misrepresenting radio broadcasting that is related to medicinal remedies and preparations for the conservation and protection of the health interests of the public."

The Milwaukee resolution anticipated the proposal now receiving widespread publicity in the newspapers for an enlargement by Congress of the powers of the commission administering the Pure Food and Drug Act. It is proposed that this commission be empowered to combine with the Radio Commission in active censorship of drug and food advertising on the radio. That such legislation is greatly needed goes without saying.

Here in Minnesota, Dr. William A. O'Brien, speaking for the Minnesota State Medical Association, showed some time ago what could be done to clean up local broadcast matter on station WCCO in Minneapolis. Such matter was submitted to Dr. O'Brien for his approval and this voluntary censorship was much more desirable than any compulsion by law.

In general, we are a little better off, so far as the large broadcasting stations go, than most states. Granted that there are mouth wash comedians and cathartic dramatists, at least there are very few air minded "Doctors" on these stations. This qualified approval does not extend to all of the small stations. In the Twin Cities, for example, there is one small station that devotes considerable part of its time to the dissemination of out and out quack medical advertising.

Efforts on the part of enlightened medical men to remedy this situation must go on even when prohibitory legislation is a fact.

The day is not long past when metropolitan newspapers printed "readers" and what indeed appeared to be bona fide news stories actually advertising patent medicines and healers. That this desecration of the news columns of the press has practically ceased is very largely due to activities of the representatives of organized medicine in the various communities who urged upon the editors a higher conception of their function in public health education. To be sure, the American Medical Association, after history making efforts in Washington, succeeded in putting into Federal Law some very stringent restrictions on this type of advertising. But the real reform came about very largely through a better understanding between local physicians and newspaper owners. In Minnesota, a legitimate news service prepared by the Public Health Education Committee of the State Society has been well received and very generally printed all over the state as a result of this growing understanding.

The owners of offending broadcasting stations may be expected to show a similar attitude of coöperation and public conscience when they can be made to appreciate the harmfulness of their radio medical advertising as it is now handled.

The work of cleaning up radio advertising from a medical standpoint is still a challenge not only to the committees of the national organization and the state associations but to the individual county societies wherever broadcasting stations operate. Individuals, acting through their local county medical societies, can sometimes do more than a federal commission to achieve a real reform.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:30 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of August will be as follows:

August 2—Cardiac Asthma.
August 9—Cause of Hay Fever.
August 16—Getting Ready for School.
August 23—Treatment of Varicose Veins.
August 30—Tumors of the Prostate.

THE 1934 STATE MEETING

Plans for the 1934 meeting of the State Society to to be held in Duluth are already taking form, according to E. A. Meyerding, who conferred with members of the St. Louis County Medical Society recently.

Tentative dates for the meeting were set for July 16, 17 and 18. These dates will be brought up for the approval of the Council at its meeting, August 6.

It is interesting to note that ten commercial exhibitors, as reported by Dr. Meyerding, have already requested exhibit space for the Duluth meeting. They are E. R. Squibb and Sons; Mead Johnson and Company; Physicians and Hospital Supply Company, Inc.; National Drug Company; Spencer Corset Company, Inc.; The Heidbrink Company; Mellin's Food; Twin City Furnace Company; Gerber Products Company, and Bilhuber-Knoll Corporation.

SCOTT-CARVER COUNTY SOCIETY

At the annual meeting of the Scott-Carver County Medical Society held at Chaska, Minnesota, in June, the following officers were elected for the coming year: President, Dr. E. J. Eklund, Norwood; vice president, Dr. M. A. Schneider, Jordan; secretary-treasurer, Dr. Douglas Ormand, Waconia; censor, Dr. T. P. Martin, Arlington.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The Southern Minnesota Medical Association will hold the annual meeting September 25, 1933, at New Ulm Minnesota, as guests of the Redwood-Brown County Medical Society. The facilities of Turner Hall are adequately adapted for the entertainment of the organization, and arrangements have been made for its use. Members of the Local Arrangements and Entertainment Committee are as follows: Dr. Theodore F. Hammermeister, chairman; Dr. O. J. Seifert, Dr. F. H. Dubbe, Dr. Albert Fritsche, and Dr. William A. Meierding.

The Southern Minnesota Medical Association has made the following awards this year: $100 to Mr. Lloyd Whitesell and the gold medal to Mr. Harold Buchstein, this award given to the senior medical student who has shown the greatest proficiency in medicine and surgery, and jointly, to Dr. R. V. Ellis, of the University Health Service, and Professor C. O. Rosendahl, Department of Botany, University of Minnesota, the medal awarded for the best scientific exhibit at the annual meeting of the Minnesota State Medical Association.

M. C. Piper, M.D., *Secretary.*

WABASHA COUNTY MEDICAL SOCIETY

The sixty-fifth annual meeting of the Wabasha County Medical Society was held at Wabasha, Minnesota, Thursday, July 6, 1933.

There were twenty-two in attendance, including members, affiliated dentists, visiting physicians and ladies accompanying.

A dinner was given those attending and entertainment for the ladies was provided through the courtesy of the Wabasha members and their wives.

At the scientific session the following papers were presented:

1. President's Address—"A Country Doctor's First Experience in Obstetrics."—Dr. Wm. B. Stryker, Plainview.
2. "The Diagnosis and Treatment of Specific Urethritis"—Dr. Anson L. Clark, Mayo Clinic, Rochester.
3. "The Use of Maggots in Osteomyelitis and Necrosis, with Illustrative Cases"—Dr. R. C. Radabaugh, Hastings.
4. "Advances in Surgery"—Dr. Waltman Walters, Mayo Clinic, Rochester.

Dr. H. Z. Giffin, Councilor from this district, was present and addressed the meeting. As the guest of Dr. Waltman Walters, Dr. William A. Mackey, a member of the staff of the Glasgow Clinic, Glasgow, Scotland, attended the meeting. Upon invitation, he gave a talk on medical and economic conditions existing now in Great Britain.

At the business session, the following officers were elected for the coming year: President, Dr. R. C. Radabaugh, Hastings; vice president, Dr. H. E. Bowers, Lake City; secretary-treasurer, Dr. W. F. Wilson, Lake City; delegate to State Association, Dr. R. H. Frost, Wabasha; alternate, Dr. D. S. Fleischhauer, Wabasha. Dr. J. A. Slocumb, Plainview, was elected censor for three years. The other censors are Dr. W. J. Cochrane, Lake City, and Dr. J. F. Bond, Wabasha.

One new member was admitted, Dr. C. G. Ochsner, who has recently located at Wabasha.

It was voted to hold the next annual meeting at Lake City.

W. F. Wilson, M.D., *Secretary.*

DIATHERMY

The Council on Physical Therapy in a preliminary statement reports that diathermy is the therapeutic use of a high-frequency electric current to generate heat within some part of the body. For want of better terminology, diathermy may be divided into two divisions: medical diathermy and surgical diathermy. Medical diathermy is contraindicated (1) in acute inflammatory processes such as acute nondraining cellulitis, acute arthritis characterized by infection, and acute pelvic infection; (2) in any condition in which there is a tendency to hemorrhage, such as a gastric ulcer, and (3) in those areas in which the appreciation of heat has been impaired or lost, as in certain peripheral nerve injuries. It is also contraindicated in diseases or injuries in which simpler methods of applying external heat give satisfactory results. The advantages of electro-surgery lie in effective destruction in loco of tissues that it is desirable to eliminate. This manifestly includes many forms of malignancy. (Jour. A. M. A., June 17, 1933, p. 1933.)

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD MAY 4, 1933

The President, Dr. Kenneth Bulkley, in the Chair

PURPURA WITH HEMATURIA TREATED SUCCESSFULLY WITH OVARIAN EXTRACT

CASE REPORT WITH PRESENTATION OF PATIENT

Dr. E. K. Green: Mr. President and members of the Minneapolis Surgical Society, I have no strictly scientific basis for presenting this case, but the results obtained were so remarkable, in the face of apparent impending disaster, that I felt the case would be well worth presenting.

Mr. P. W., seventy-nine years old, consulted me the first week in May, 1932, and on examination I found on his right forearm, from the elbow to the wrist, a large purpuric area with varying degrees of intensity of color. There was no history of injury. The patient also had considerable hematuria.

I did not see him again until two weeks later when he came to my office complaining of severe pain in the left side of his back in the kidney region. The purpuric area on his arm had practically disappeared but he still had marked hematuria. I sent him to the hospital, where he very quickly became seriously ill, with nausea and vomiting and a great deal of pain in the left back. After four or five days I asked Dr. Theodore Sweetser to see him in consultation and we agreed upon the need of a cystoscopic examination.

There was nothing abnormal found in the bladder except slight trabeculation, but bloody urine was coming from the left ureter. A catheter was passed up into the left kidney and a pyelogram made which appeared practically normal. We evidently had not proved any gross anatomic cause of the hematuria but felt that a small renal tumor could not, with certainty, be ruled out.

We then discussed exploratory operation but on account of his age and on account of being a poor operative risk, his family delayed giving consent until several days had elapsed, when we found he had developed considerable pain on the right side of his back. Dr. Sweetser then did a second cystoscopic examination which showed bloody urine coming from the right ureter and no urine from the left ureter. On passing the ureteral catheter clear urine was obtained from the left.

We then felt we must change our tactics as we were probably dealing with a condition altogether different, so we endeavored to see what could be done in the matter of medication to bolster up the clotting time of his blood. We made a more complete check-up on the blood and found the hemoglobin, which was 78 per cent when he entered the hospital two weeks previous, had fallen to 58 per cent. The red blood cells had dropped from 4,260,000 to 2,870,000. The leukocyte count, on entrance, was 12,650 and now was 15,900. P.M.N.'s remained the same, *i.e.*, 80 per cent. The capillary resistance test was normal. Platelets were 350,000, the bleeding time was three minutes and the clotting time eight minutes.

During his stay in the hospital he had developed several hemorrhages into the tissues in various parts of the body. The hemorrhages on his left forearm were the most marked. The arm was greatly swollen, hot and painful for a time, the ecchymotic area extending from above the elbow down to the hand. He also had small ecchymotic areas in the region of the right shoulder, left hip and about the left ankle.

We gave him Coagulin Ciba in usual dosage intramuscularly every day, also some calcinates and styptesate, and twice Dr. L. K. Buzzelle injected whole blood from a male donor into the muscle. His condition was getting desperate. In a few days his hemoglobin had made another drop of 11 points to 47 per cent. He was very weak, nauseated all the time and only with great difficulty were the nurses able to get him to eat. He became discouraged and stated that he felt he was not going to get well. We were preparing for a blood transfusion when Dr. Sweetser called my attention to an article written by Drs. Alvin G. Foord and Ben R. Dysart of Pasadena, published in the *American Medical Journal*, issue of April 23, 1932. They reported a case which was finally determined to be a distinct hemophilia, the patient having had intractable hemorrhages following a tonsillectomy. Two blood transfusions were done and the pillars sutured with but temporary benefit in arresting the hemorrhage. They finally gave one injection of "Parke Davis Soluble Extract Ovarian Substance" (whole ovary) and the paticnt ceased bleeding at once followed by an uncomplicated recovery. Their theory was that hemophilia is a male disease and that the substance which the female has and which the male does not have is an ovarian hormone so that on this basis the extract was given.

On the strength of this report we gave our patient an ampule of Parke Davis product and the next morning, much to my surprise, he greeted me saying, "Doctor, I feel better. I was able to sleep a little and I really enjoyed my breakfast."

From that time on our patient gradually improved. A few days later he was given another dose of the ovarian extract. Three days from the first injection blood disappeared from the urine and none has been found since. The purpuric areas disappeared from his body and after a short time he was ready to get up and walk about. Within a week he was discharged from the hospital.

About four or five months later the patient developed a hemorrhage into the tissues just back of the left axilla. There was a quantity of extravasated blood making a mass as large as a small orange. The induration extended as far as the middle of the back and down the arm below the elbow. There was no hematuria. We gave him a dose of ovarian extract and the condition promptly cleared up. However, we are not certain that this hastened his recovery.

In reviewing a case of this type, according to Theis, four main groups must be considered:

1. Hemophilia is distinctly a male disease but is usually a disease of younger life and the most marked symptom is that of bleeding following a tonsillectomy, circumcision, the extraction of a tooth or minor cuts. Many times, with no accident, patients will go for some time without bleeding. In hemophilia coagulation of the blood is decidedly prolonged while in our case it was normal or only slightly prolonged. The platelets remain normal above. It is this class of cases in which we are getting favorable reports by treating with ovarian extract.
2. Essential Thrombocytopenic Purpura, a condition where the bleeding time is prolonged but the coagulation time is normal. In these cases the platelets are markedly reduced and, as a rule, it is a disease of children or young people.
3. Anaphylactoid Purpura is a result of infections such as Septic Endocarditis, Erythema Nodosum, etc. In our case his temperature and his pulse gave us no suspicion that he had an infection.

4. Purpuras with no known etiology—Purpura Simplex, Purpura Fulminans (quickly fatal), Purpura Senilis, Mechanical Purpura and Hereditary Purpura.

In classifying our case it would seem most likely to be Purpura Simplex or Purpura Senilis complicated with hematuria. Just what influence the ovarian extract has in stopping the hemorrhage, if any, I am unable to say. However, the procedure is so simple that, if there is any possibility of benefit, it ought to be tried.

PUBLICATION OF PROCEEDINGS

Dr. Carl B. Drake, St. Paul (by invitation): I am glad to avail myself of the opportunity to say a few words about the relations of the Minneapolis Surgical Society and Minnesota Medicine.

I feel that I am pretty well acquainted with the proceedings of your Society because I have read them all since they have been published and had read all the papers that have been presented and published in Minnesota Medicine. The papers and case reports have been very interesting to me and I am sure they have been so to the readers.

The standing of a journal depends primarily on the quality of the material it gets. Most of the articles we publish are so-called "popular" articles, but we do receive quite a number of papers which are real contributions in spite of the fact that one country doctor said that the only article we ever published worth reading was one on "Constipation" by Dr. Gardner of Minneapolis.

As to the publishing of the proceedings, the proper way would be to have the discussions of the papers read before the Society published with the papers. There are a good many reasons why it is often not possible to have the papers appear with the proceedings in the same issue of the journal. It takes a little time to set a paper up, review proofs, and sometimes an article is not sent in promptly. It would be a mistake to hold up the publication of the proceedings on account of a delay in receiving and preparing an address for the printer.

I would welcome any suggestions as to the method of publishing your proceedings or any criticism as to the way the proceedings appear. We had a little difficulty at one time as to the form of the proceedings. It is true that a great many doctors are not only unable to express themselves offhand on the floor but, even after going over their discussions, return them to the stenographer in a condition not at all suitable for publication. If the material does not appear in the proper form it is a reflection on the journal and on the Society itself. It is therefore to the interest of your Society and of the journal to have the proceedings prepared in the proper form.

Inaugural Thesis

POSTOPERATIVE EVISCERATION

Dr. Ralph T. Knight, Minneapolis: There are other subjects much more pleasant to present than the one chosen for this paper. Fortunately, no surgeon encounters postoperative evisceration frequently. We would all much rather not meet it at all. One would not choose to be known as a surgeon who has had a wide experience with it. Most other surgical problems come to us ready-made. This one develops under our very care, and is usually experienced with some feeling of chagrin. One ventures to say, however, that few surgeons have done any considerable volume of abdominal surgery without having to deal with it.

The very nature of this problem is such that it does not lend itself to laboratory experimentation and research. Even clinical research is very difficult and uncertain because cases are very scattered, individual surgeons have very few cases, a very large proportion of cases are unreported and never can be collected. Even those which can be and are collected differ greatly in the details of physical and laboratory findings, treatment, and results which are recorded and available for comparison.

Dr. Louis Sperling at the University of Minnesota Hospital has recently reviewed a summary of European literature and collected cases by S. Sokolov of Leningrad in "Ergebenisse der Chirurgie und Orthopadie," 1932, and has kindly allowed me to use his notes.

Sokolov found many isolated cases in the literature from which it is difficult to draw conclusions. He found a series of 157 cases collected by Madelung in 1905 and 208 additional ones collected by Albichy in 1924. He sent out 1,140 letters to surgeons and clinics and thus collected other cases. In all, he collected 723 cases, but states there must have been a great many more unreported. He found an average of one evisceration in approximately 2,000 abdominal operations. In one series of 6,614 gynecological laparotomies there were 11 eviscerations. He found them occurring in the simplest short explorations in clean cases as well as in long complicated operations.

In all series, males predominated, 63 per cent being in males and 37 per cent in females. He attributes this to alcoholism, abdominal breathing and lack of abdominal elasticity in the male as compared to the female.

Age he believed unimportant, although most cases occurred between 40 and 50, probably because more operations are done in this decade. Ten of the cases occurred in the first decade. Occupation seemed to have no influence.

General anesthesia preceded 78 per cent, regional and spinal 12 per cent, and local 10 per cent. This is not conclusive as general anesthesia was used in an unknown and greatly predominating number of all cases.

The primary lesion for which the operation is done he found to have a strong influence upon the occurrence of evisceration. In the order of occurrence, these were as follows:

	Per Cent
Malignancy	27
Peptic ulcer	16
Gallbladder disease	10
Intestinal obstruction	9.1
Appendicitis	3.7
Ruptured viscus	2.2
Gynecological operations especially myoma and malignancy	15
Miscellaneous	7
Peritoneal infection	8

The type of incision seemed to bear some influence. In 606 cases in which the incision was well recorded, 76 per cent followed a mid-line, para-rectal came next with about 12 per cent, diagonal next with 7 per cent, paramedial with about 3 per cent and the transverse smallest with 2.3 per cent. There were about 15 per cent more cases above the umbilicus than below. Mid-line incision is not recommended because of the thinness of the wall and lack of blood supply. Pararectal is not recommended on account of injury to motor nerves. Although these incision figures are interesting, Sokolov does not consider them conclusive as he had no figures on the total number of times each incision was used. After all, he does not consider the type of incision as important as the primary lesion and the general condition of the patient and the condition of the tissues.

After analyzing the types of suture materials and methods of suturing, he does not believe they have much influence. Forty per cent followed the use of silk and 36 per cent followed catgut.

The time of year seemed to have a notable bearing. Fifty-five per cent of cases occurred in winter and spring, 45 per cent in summer and fall. This Sokolov attributed to debility of the patient, diminished sunlight, and avitaminosis, especially of Vitamin C, bringing about atony of all tissues. He states that 16 per cent of the cases in the 1926 series showed definite prescurvy symptoms.

The general condition of the patient as brought about

by the primary lesion, etc., he deems of great importance. Seventeen per cent had definite anemia and cachexia. Seventy-six per cent were generally defective, atonic, etc., with changes in the colloidal structure of the tissues, acidosis, etc.

Other constitutional factors were important, such as malignancy, pregnancy, adiposity, disease of the nervous system, and infectious diseases.

He does not consider infection in the wound as one of the most important causes because only 15 per cent of the eviscerating wounds showed any signs of infection and many of these healed well after re-suture.

His conclusions as to the causes of evisceration are as follows:

	Per Cent
Bronchitis, pneumonia, etc.	37
Anemia and cachexia	16
Infection of wound	15
Persistent vomiting	7
Abdominal distension	2.5

His percentages are thus incomplete. Pulmonary complications with resulting coughing appear to be of primary importance.

Rupture of the wound may occur any time in the first twenty-one days. The greatest number occur on the 7th, 8th, 9th, and 10th days with the peak on the 8th day.

The treatment given for 614 of the cases collected was as follows:

Resuture	Per Cent	Mortality
411	66	32
203	33	35

However, those re-sutured were the better risks while those not re-sutured were such poor risks that re-suture was not deemed advisable. Sixteen of the re-sutured patients ruptured two to five times. Six of these survived, two after repeated suture, four after open treatment. Ten of these died, seven after repeated suture, three after secondary open treatment.

Of sixteen patients who eviscerated following operation for perforated ulcer, ten were given open treatment, one of whom died. Six were re-sutured and three of these died.

The causes of death were given in the following order of frequency: peritonitis, pneumonia, shock, cachexia from malignancy, etc., heart failure.

Sokolov recommends the following preventive measures:

1. Elective operations should be done in the summer and fall.
2. After extensive case study, build up the patient, and even let him go home for two weeks before operation, to recover from the tire of the examination.
3. Take special precautions in preparation, and use no catgut in patients with anemia, cachexia, or malignancy.
4. Use oblique, transverse, and paramedial incisions and avoid pararectal and mid-line incisions.
5. Prevent post-operative distension.
6. To avoid pulmonary complications do not bind the abdomen for the first four or five days; after that it is better to do so.
7. Delay the removal of sutures, but this must depend upon the individual case.
8. Prevent pulmonary complications and cough.
9. Give abundant fluid intake for healthy tissue effect.
10. Keep the patient quiet.

In the matter of treatment Sokolov recommends that the open treatment be used, with or without strapping, except in individual cases in which suture seems absolutely necessary.

Willard Bartlett of St. Louis in his book on the "After-Treatment of Surgical Patients," C. V. Mosby, 1920, also gives an abstract review of Madelung's series of 1905. In contrast to Sokolov, however, he states that the accident occurs almost five times as often in women as in men, and almost eight times as often in the lower abdomen as in the upper abdomen. Like Sokolov, he states that the most frequent immediate cause is coughing, being responsible in almost one-third of the cases, while vomiting is responsible in one-sixth. Bartlett states that the prognosis does not depend upon the kind of viscera prolapsed, the size of the mass, or the time before treatment is instituted. He states that 105 out of 148 patients were reported as completely cured and that the accident was followed by death in 29 out of 157 cases.

Bartlett concludes with a brief report of his own in which he states:

"The author of this chapter has been so unfortunate as to have experienced this embarrassing complication seven times. All were clean cases in which reposition and secondary suture within a few hours were carried out without great difficulty. All the patients with but one exception were taken to the operating room and completely closed up with through-and-through sutures, ether being used only once. The other six closures were accomplished with seemingly very little pain in the absence of even a local anesthesia. This we credit to very gentle manipulation and the use of exceedingly sharp cutting needles of the Reverdin type."

Bartlett stresses the fact that the accident rarely carries much immediate danger to the patient in the way of shock, etc., and that treatment should tend to be conservative rather than too hasty. He agrees with Sokolov that the best treatment in many cases may be nothing but dressings and perhaps strapping.

Crandon in his volume published in 1920 on Surgical After-Treatment rather stresses the immediate danger of shock.

The index of the literature did not yield any articles in American periodicals on the subject.

Dr. Max Thorek in his "Surgical Errors and Safeguards," 1932, says very little concerning the occurrence of post-operative evisceration, but he quotes Arthur Dean Bevan's description of his favorite method of closure as a prophylactic against its occurrence. After a minute description of the insertion of four tension button sutures, in addition to the running catgut closure of the peritoneum and posterior sheath, four interval through-and-through sutures taking in all but the peritoneum, running catgut closure of the anterior sheath, and interrupted silk stitch closure of the skin, the quotation from Dr. Bevan is as follows:

"We have been using these button tension sutures in the clinic for about 15 years in almost all of our abdominal incisions. They have proved to be of very great service. They have eliminated almost entirely the accident of evisceration following early removal of the stitches, an accident which is very apt to happen in operations on the stomach and operations on the bile tract, especially in patients whose wound repair is slow and in patients who either have infections of the wound or have a post-operative lung complication, with resulting coughing, and of course, this may happen in individuals who vomit a great deal following operation."

A good many surgeons advocate interrupted chromic sutures for closure of the anterior sheath. It would seem to the writer that if time is to be used for interrupted sutures, it would be better to use it on the fascia of the anterior sheath than on the skin. Skin clips offer a time saving method of interrupted skin suture if that is desired. Sokolov warns against clips in types of patients in whom bursting of the wound is to be feared, as the clips may drop into the abdomen and injure or perforate some viscus.

The writer had never experienced the accident of post-operative evisceration until the last 15 months. In that time it has occurred to him four times. These four cases are as follows:

Case 1.—A man, aged seventy-four, extremely vigorous and in active business as a city and traveling sales-

man, presented himself in January, 1932, complaining of periods of constipation, dating back about three months, occurring every ten to fourteen days, lasting two or three days, accompanied by cramps in the lower abdomen, and ending with a day or two of loose stools, sometimes accompanied with a little blood. Sigmoidosocopic examination revealed nothing, but a fluoroscopic and film examination of the colon with barium meal and clysma revealed an annular filling defect high in the sigmoid, 2 inches long with abrupt margins at each end and ragged longitudinal borders. A diagnosis of carcinoma was made.

Past history was entirely negative except that for years he had been subject to fits of violent coughing, daily, especially early in the morning, and following meals, resulting in the raising of moderate amounts of thick mucus.

General examination was negative.

He entered Abbott Hospital January 17, 1932, and on January 21, under spinal anesthesia through a McBurney incision, an appendectomy and cecostomy was done. Ethylene was given for a few minutes during closure. The procedure took 79 minutes.

A course of autogenous fecal vaccine prepared by Dr. Larson was given subcutaneously.

The day after the cecostomy he developed pharyngitis, lasting two or three days.

On January 31 he developed pleurisy pains and the next day lobar pneumonia was evident in the right chest. On February 8 recovery seemed complete but on February 9 he developed lobar pneumonia in the left chest.

On March 3 a first stage Mikulicz operation was done through a low left oblique incision. The carcinoma-bearing loop was mobilized and brought out of the wound, which was closed about it. A rubber tube was used overlying the skin between the two limbs. The work was done through a left paramedial incision, not however passing through the rectus muscle. This was closed in layers using chromic catgut in the anterior sheath and dermal in the skin. No stay sutures were used as the patient was slender and there was none too much room. The wound was dressed so as to seal it off the cecostomy wound.

Spinal anesthesia was used without anything supplemental. The procedure took 82 minutes.

The patient soon had a very distressing cough which was controlled with difficulty.

On March 10 with a little nitrous oxide the tumor was removed with an endotherm knife. On March 12 during a fit of coughing, nine days after the first stage Mikulicz operation, the para-medial incision burst open and the bowel was extruded over the soiled abdomen.

The patient was taken to the operating room, the bowel washed with physiologic saline and replaced within the abdomen.

It was impossible to strap the wound shut on account of the cecostomy and sigmoidostomy. Under spinal anesthesia loops of adherent bowel were separated from the entire length of one side of the wound and the wound was closed with through-and-through sutures, the peritoneum, fascia, and skin being closed additionally.

The patient lived six days, until March 18. At partial autopsy the wound was found solid, but there was gross peritonitis.

Case 2.—A man aged fifty-nine, 5 feet 10 inches in height and weighing 225 pounds, entered Asbury Hospital March 3, 1932, complaining of pain in the epigastrium and right subcostal region of six months duration. The pain was intermittent, not extremely severe, not noticeably related to meals. There was, however, considerable epigastric pressure and sour eructation immediately after eating. The typical pain was often brought on by bending forward and often relieved by lying down. Many individual days and often several in succession had been without pain.

General examination was negative except that the respiration was slightly wheezing, there was a slight hacking cough and scattered small whistling râles throughout the chest. He stated that he had had the slight cough for years and wheezed a little at times. The abdomen was obese and there was tenderness under the right costal margin. Flat films of the gall bladder taken in the office before entering the hospital without the use of gall bladder dye, showed the gall bladder distinctly. Films taken after the ingestion of dye showed practically no increased density and the fat meal reduced this density practically none.

On March 5, 1932, cholecystectomy was performed through a right rectus incision under spinal anesthesia with ether added for the last 30 minutes to close the wound. He was in excellent condition through the following day. On March 7, the cough increased and steam inhalations and codeine cough syrup were given. On March 9 a definite pneumonia had developed. On March 12, seven days after the operation, during an especially hard coughing spell, the wound broke open almost its entire length. When I reached the hospital the interne had already strapped the wound and by the next day I was able to approximate the entire skin edge by strapping. This tended to separate, however, and when he left the hospital on the twenty-sixth post-operative day, there was still a small granulating surface which did not entirely heal for another week. He was then wearing a canvas binder and there was no evidence of a hernia. He returned to report five months after leaving the hospital. He was wearing a binder and there was a large incisional hernia.

Case 3.—A man, aged fifty-nine, 5 feet 11½ inches tall and weighing 230 pounds, entered Abbott Hospital April 27, 1932, complaining of severe pain of three days duration in the right hypochondrium, intermittent and lasting from one to five hours. He had also had increasing jaundice for twenty-four hours. For several years he had had right upper quadrant distress especially after eating fatty foods or cabbage. The distress was never relieved by food. Once before he had been jaundiced. He had used liquor freely all his life.

His general health had been good. He was considerably overweight, had some dyspnea on exertion and had some chronic bronchitis.

General examination including blood pressure and urine was negative except for obesity, a few whistling râles, upper right quadrant tenderness, moderate jaundice, and bile in the urine.

Cholecystectomy was done on April 28, 1932. Spinal anesthesia was given but was incomplete and was supplemented with ethylene and ether as soon as the abdomen was opened. The gallbladder was tightly distended, edematous, and full of stones and light bile, one large stone in the neck of the gallbladder impinging upon the common duct. Below this point the common duct was not distended and no stones could be palpated in it. In closing, a Penrose drain was inserted through the upper end of the wound to the stump of the cystic duct. The wound was closed with double plain in the peritoneum, double chromic continuous in the fascia, three heavy dermal figure eight stay sutures through skin and fascia and dermal in the skin. Immediate post-operative condition was excellent.

Recovery for several days was excellent except that on April 30 there was some distension and gulping which was quickly relieved by nasal gastro-duodenal suction. By May 2 his jaundice had markedly cleared. On that day there was some recurrence of distention which was again relieved by suction, and he was again able to take fluids and semi-solids by evening. Also on May 2nd he began to cough and complained that he felt something "snap" in the wound. Some pink serous drainage appeared. On examining the wound no evidence of herniation was found. On May 5, seven days post-operative, coughing was continuing, the stay sutures were cutting badly and giving much distress.

They were removed and solid adhesive strapping was replaced from loin to loin. There was only a faint small pink serous stain on the dressing. On May 7, nine days post-operative, the patient had pleurisy pain, chills, and fever and pneumonia was evident. On May 9, eleven days post-operative, the wound burst open. Omentum and bowel were reposited as well as possible and the wound strapped. From that time on hiccoughing and regurgitating and distension were very persistent in spite of nasal suction. On May 14, seven days after onset of pneumonia, five days after evisceration, and following four days of normal temperature, because of increasing distension and regurgitation, the evisceration was reduced and the wound closed.

Under spinal and field block anesthesia the omentum and bowel were gently separated from the wound and the wound closed in layers in addition to through-and-through heavy dermal.

The toxic condition of the patient did not improve, he gradually went into coma and died thirty hours after closure of wound.

Autopsy including the head showed:

An area of necrosis 3 cm. in diameter adjacent to the incision.
Bilateral bronchopneumonia.
Toxic paralytic ileus.
Cholecystectomy.
Slight coronary sclerosis.
Congenital hydrocephalus.

Case 4.—A man, aged fifty-five, small town stock and produce buyer, 6 feet 1 inch tall, and weighing 200 pounds, presented himself June 18, 1932, for a complete examination. For many years he had had indigestion and gas, relieved more or less by soda, always worse immediately after heavy meals. In the summer of 1921, he was in bed for a week with severe intermittent pain in the epigastrium lasting one to several hours. In February, 1932, he was sick in bed for a week with severe steady pain across the lower abdomen, accompanied by distention and constipation. Gradual improvement took place. History otherwise was negative except that for years he had had chronic bronchitis, sometimes simulating asthma, coughing being quite productive each morning.

Examination was entirely negative except that x-ray films of the right upper abdominal quadrant without gallbladder preparation showed a large ring shadow. Operation was advised. The second attack described above was supposed to have been one of appendicitis.

The patient returned and entered St. Barnabas Hospital on Nov. 15, 1932. He had been ill for two weeks with severe intermittent pain in the upper right quadrant radiating to the right scapula and accompanied by vomiting.

On November 16, under spinal anesthesia supplemented with ethylene and ether, through a right rectus incision, appendectomy and cholecystectomy were performed. The appendix was extricated from an old healed appendiceal abscess mass which had caused partial obstruction and chronic moderate dilatation of the terminal ileum. A very large thick-walled edematous gall bladder containing many small stones and one very large one was removed. A Penrose drain was placed through the wound to the stump of the cystic duct and the wound was closed in layers using double plain in the peritoneum, double running chromic in the fascia, four figure eight heavy dermal through the skin and fascia, and dermal in the skin.

The patient immediately began pounding away at the wound with a heavy, deep productive cough. On November 18, two days post-operative, his temperature rose to 102, he developed dullness and bronchophony over the lower right chest and a small area low in the left axilla. Massive collapse on the right was very evident the next day. On November 20 there was very copious purulent bronchial discharge. By November 23 the chest findings were almost entirely cleared up. Coughing and moderate expectoration continued. On November 26, ten days after operation, there was an unexplained temperature of 101. The stitches were all cutting so much that they were removed. The abdomen was well strapped.

That evening, ten days after operation, the wound burst open and a large mass of intestines appeared on the abdominal surface under the strapping and dressing. With a sterile glove I carefully reposited the bowel, drew the wound together over it, and held it closed with overlapping 2 inch strips of adhesive from loin to loin and from lower chest to pubes. Every effort was made to control the coughing. The next morning a large mass of intestine was found protruding from under the pubic margin of the adhesive casing.

The patient was taken to the operating room and under spinal anesthesia the omentum and small bowel were gently loosened from the entire margin of the wound to which they were adherent, the intestines were replaced in the abdomen and the omentum spread well over them. Six through-and-through mattress sutures of number 3 chromic were inserted 1.5 inches from the wound margins, passing barely inside the peritoneal margins on each side and emerging 1.5 inches from the skin margin on the opposite side. On each side the two limbs of the mattress suture passed through holes in a large button and they were tied on one side with a bow knot. Six well soaked heavy dermal mattress sutures were also put through in the same way except that they touched the peritoneal margin but did not enter it. The skin was then closed with light dermal.

Progress thereafter was fairly uneventful except that the cough continued, distention at times was rather distressing and was controlled with the duodenal tube. Fifteen and twenty-two days after the secondary operation, there were attacks of pain simulating biliary colic, and copious serous drainage from the wound, evidently peritoneal fluid, continued for three weeks. As the dermal mattress sutures cut and loosened they were readily untied, snugged up, and re-tied. They finally cut almost through and had to be removed December 18th, twenty-one days after secondary closure. The abdomen was kept strapped. The patient left the hospital in good condition December 27, thirty days after secondary closure. There was only slight crusting at the upper end of the wound. There was no evidence of herniation. He was fitted with a special belt. He was last heard from three months after leaving and stated that the wound seemed perfectly solid.

My impressions from the literature and from my own small experience are as follows:

Pulmonary complications present the greatest danger to wounds and should be especially guarded against. All four of my cases, however, were faithfully hyperventilated.

Interrupted chromic sutures in the fascia are most probably worth while.

The most serviceable form of stay sutures are the mattress type inserted through and tied over buttons in a bow knot so that their snugness can be adjusted from day to day. One limb should go down to the peritoneal margin and the other should loop around the fascial margins.

When evisceration takes place the ideal treatment is gentle reposition of the mass and simple rapid through-and-through closure with mattress sutures over buttons. If reposition is not easy, plenty of time may be taken for reduction of distention before it is attempted.

Closure by layers is not necessary or practical and should not be attempted.

If the patient's condition does not warrant even simple closure, then dressing and strapping offers pretty good results, but large hernias are likely to result.

Spinal anesthesia is a great help in reposition and

para-incisional field block is the logical supplemental anesthesia if one is necessary.

DISCUSSION

Dr. J. F. Corbett: This is a complication which most of us have anticipated more often than it actually has happened, and for that reason it has been my personal custom when I thought I was on "thin ice" or my patient was, to instruct the interne to have a square of sterilized dental rubber on hand so that if evisceration did occur it could be thrown over the intestines and as little damage done as possible. Also, the further instruction to attempt to gather the viscera together for replacement into the abdomen and make a Mikulicz's tampon with the rubber and gauze.

As to the occasions when we expect this to happen, one is intussusception in children, which is very apt to be followed by evisceration, and another is where healing is going along very well up to about the tenth or twelfth day. The most remarkable accident of this kind that I ever saw was following the removal of a non-perforated appendix. The wound was clean and the whole incision opened up just as though no sutures had been placed. That patient had a positive Wassermann and in very carefully examining the wound I could find no trace whatsoever of any catgut in the tissues, so I assumed there was something about his blood condition which destroyed the suture material. I closed the wound again and it healed very promptly.

Again, for instance, you may have a diffuse peritonitis where there is a large amount of pus, and no matter how much you suture or wire, you are not apt to have good healing. In those cases I have anticipated what would happen later and have used a Mikulicz's tampon, using no sutures whatsoever.

Dr. J. M. Hayes: Dr. Corbett spoke of his case having a positive Wassermann. That reminds me of a case I had several years ago. We removed the sutures on the twelfth day. There was no sign of any acute infection and we thought the wound was healed. A slight cough caused the wound to open from one end to the other and it showed very little evidence of healing.

This patient had a positive Wassermann and healed nicely after being put on an anti-syphilitic treatment. Whether this was the real cause of delayed healing or not I cannot be sure.

About twelve years ago we removed the sutures on another patient on the twelfth day. He was apparently healed and was getting about. He came into the out-patient department the next day with his intestines held back only by the dressing. This patient did not have a positive Wassermann nor did he have any infection in the wound. Since, I have not removed the sutures from an abdominal wound sooner than the fourteenth or fifteenth day.

Dr. W. White: In the matter of closing the abdomen I believe that it is very important to have the patient completely relaxed in making the closure. If one is using a spinal anesthetic and sensation begins to return, some means of supplemental anesthesia should be used immediately. Also, if a general anesthetic is being used the patient should be completely relaxed so that it will not be necessary to close the abdomen while the patient is straining, because straining not only makes the closure more difficult, but omentum or bowel is apt to be included in the line of suture and therefore predisposed to post-operative complications, among them hernia formation or even evisceration.

Dr. Knight mentioned a point which Dr. Arthur D. Bevan has spoken of and emphasized a great deal, namely, concerning the use of skin clips in abdominal wounds. They should not be used to close the skin of the abdomen because if spreading of the abdominal wound does occur there is a danger that the skin clips may fall into the wound and be the cause of very serious complications, and there is not enough advantage in their use to warrant this added risk.

Dr. Knight should be complimented on bringing this subject up for discussion. One likes to tell about spectacular cases and those in which an unusually fortunate outcome has resulted, but it takes quite a little courage to report a series of cases where unhappy complications have occurred. Nevertheless, it is by a consideration of cases such as these that members of the profession may derive more profit rather than by a review of the unusually fortunate cases.

Dr. Kenneth Bulkley: I rather question whether the mode of closure, provided it comes within the ordinary, normal, accepted standards, has much to do with the development of evisceration. Furthermore, if we bear in mind the point brought out by Dr. Knight in regard to the interval following operation that evisceration is most apt to occur, I question whether the matter of edema enters the situation. The primary causes of evisceration lie within the patient himself and probably are related to his general condition.

I would list, as the first and most common cause, anemia and more commonly a secondary anemia, and, above all, a secondary anemia associated with malignancy. The second largest group of eviscerations occur in children, particularly in very young children and particularly secondary to operation for intussusception. All such patients, I believe, when operated upon should be closed by figure of eight non-absorbable suture material.

I would classify syphilis as the third most common cause of evisceration, and, finally, there is a group of patients, the usually obese, not necessarily anemic, but non-athletic, flabby type of female, often from the lower walks of life.

Dr. Gilbert Cottam: This subject is a very vital and important one, for the presentation of which the essayist deserves strong commendation.

To my mind this complication of abdominal surgery is an accident into the production of which more than one factor usually enters. Thus we may find the predisposing conditions, such as local or constitutional defects which retard the process of repair and then, as the immediate precipitating factor, a more or less sudden stress, such as coughing, sneezing, and so forth, which completes the act of bursting the stitches and extruding the viscera. Among these predisposing factors is any condition which produces prolonged increase of intra-abdominal pressure; for instance, long continued gastro-intestinal distention, large tumors and advanced pregnancy. In my observation these produce ischemia, atrophy and diastasis of the musculature of the abdominal wall as well as thinning and friability of the fascial and aponeurotic planes.

I fully concur in what the essayist said about the necessity of careful suturing in all cases, especially with reference to the use of adequate stay sutures. It has been my practice for years, since Wyllys Andrews gave us his valuable imbrication technic, to use overlapping methods routinely in closing the fascial and aponeurotic layers, for, after all, on these we must depend for strength rather than on the other anatomical structures in the abdominal wall. Then, if acute stress as from a pulmonary complication occurs, we have at least taken all the precautions possible in so far as our present knowledge extends. Difficulty from pulmonary complications is more common than published statistics would indicate.

Dr. Ralph T. Knight (in closing): I very much appreciate the discussion given this paper. In final review I think that perhaps there are several points which each one of us should stress in our own minds. One of these, I believe, is the matter brought out about tying the sutures too tightly. If edema does occur, stitches which are too tight will cut or strangulate the tissues and interfere with sound healing.

The second is the importance of relaxation for

closure as brought out by Dr. White. Closure is at best difficult and uncertain if done while struggling against tense muscles and extruding viscera. Whatever the type of anesthesia, it should be sufficient. By all means, if one is using spinal anesthesia and it begins to recede, start to supplement it soon enough. Whatever supplemental anesthesia one elects to use, start it at the slightest hint that anesthesia is no longer complete, and give enough of it to obtain complete relaxation.

The remarks by Dr. Corbett and Dr. Bulkley about syphilis are important. Dr. Bulkley also laid stress upon anemia, as did the writers whom I quoted. We must see that our anemic patients and our syphilitic patients are properly prepared for operation.

Two of the above points, then, have to do with the "Preparation of the Patient" and two have to do with the "Technic in Carrying out the Operative Procedure."

Dr. Cottam has especially mentioned the abdomen which has been chronically distended before operation. I have seen it mentioned in the literature as a paradox that a wound should burst in spite of a greatly reduced intra-abdominal pressure after operation. It must be due to the thinned, attenuated, anemic condition of the abdominal wall, and this can usually not be modified before operation. If, in addition, the abdominal disease has resulted in a general secondary anemia, this can and should be corrected.

As we each have had personal experience with so few of these cases, we tend to attach most significance to the special feature of etiology and treatment which seemed paramount to us in those few. This I have done with pulmonary complications resulting in coughing. We must remember that many factors enter into every case and we must keep them in mind.

EMERGENCY TREATMENT OF FRACTURES OF THE UPPER AND LOWER EXTREMITIES

Dr. R. C. Webb: The Committee on the Treatment of Fractures of the American College of Surgeons have published an approved method of applying emergency treatment in the "Outline of the Treatment of Fractures." The Committee is interested in having this method adopted as widely as possible and in having all ambulances operating in the United States carry the Thomas-Murray hinged splint for upper extremity fractures and the Keller-Blake hinged half-ring splint for lower extremity fractures during transportation and for first treatment.

These splints are now standard equipment for ambulances in New York and Philadelphia and the United States Army.

Dr. Webb then presented a moving picture film illustrating the application of these splints by members of the Rescue Squad of the Philadelphia Fire Department. These firemen had received their instruction from Dr. Hubley Owen of Philadelphia and the film had been prepared by Dr. Owen with the assistance and approval of Drs. Charles L. Scudder, Dr. Clay Ray Murray and Dr. Robert H. Kennedy.

DISCUSSION

Dr. J. F. Corbett: Here is the situation: this problem of handling fractures must be put across to the men who are actually involved, ambulance drivers, firemen, whoever they are. The Fire Department have already taken on the pulmotor and they do that work most efficiently.

This propaganda should be widespread. The preamble which Dr. Webb has read is an excellent one. These splints, with definite instructions such as could be developed from seeing these pictures or actual demonstrations, would be of value to those who must handle the injured. The Police Department should be so instructed that they would not permit a patient with a broken leg to be dragged about. Their instructions should be to allow them to lie where they are, protecting them as well as possible, and not to move them until proper appliances are at hand.

Fractures are usually handled by ambulances and the personnel should have the proper equipment. We must have the Ambulance Companies, the Police Department and the hospitals all working with us.

It seems to me we ought to pass some definite resolution directed toward the proper authorities, in the matter of equipment for ambulances. Simply providing the ambulances with this equipment is not sufficient, but proper instructions must be given. I move that a Committee of one be appointed to draw up the proper resolution and present it to the authorities, carrying with it the full authoriy of the Society.

Dr. E. K. Green: I second Dr. Corbett's motion.

Dr. H. O. McPheeters: Isn't it a pretty big task for one man to draw up the resolution, ascertain just where to send it and follow the thing through?

Dr. R. F. McGandy: I think it would perhaps be better, before we adopt a motion such as this, to have this motion-picture presented before the various hospital staffs. We should remember that surgical societies are acquainted with the facts of this film. This, in my opinion, is not true of general practitioners, practitioners in other fields and laymen. I have had the pleasure of seeing this film before, when Dr. Webb presented it at the Abbott Hospital Staff Meeting. At that time he read the opening statement of Dr. Wm. Darrach in his Oration on Fractures. I am sorry Dr. Webb did not read that this evening.

Many of the larger industries in this city are prepared to use some manner of splinting at the site of the accident. However, this splint has never been brought to my attention before. I certainly agree that it would be a very good idea to have these splints in the hospital to be exchanged with ambulance drivers when a patient is brought in. It would also be of great help to the doctor, in a home where he was called to see a fracture, to have the ambulance driver present him with one at the time the patient is to be transported to the hospital.

CORRECTION

Dr. W. A. Hanson's discussion of the paper given by Dr. Gilbert Cottam entitled "Pulmonary Embolism" at the May, 1932, meeting of the Minneapolis Surgical Society, was apparently misquoted. The discussion appeared in Vol. XV, page 559, August, 1932, issue of Minnesota Medicine, and should have been as follows:

All members have been interested in pulmonary embolism, more especially after having cases of their own. Many theories as to cause and treatment have been postulated, the preoperative and postoperative care being most essential. Dr. R. C. Coffey, Dr. E. Pool and Dr. Waltman Walters have been especially interested in this complication. Dr. Waltman Walters found that giving thyroid extract postoperatively to the patients, thus incrcasing their metabolism and their circulation, and with deep inspirations, changing posture and early movements of their lower extremities as well as having patients inflate small balloons, reduced this complication materially. Pulmonary embolism rarely occurs following thyroidectomies of either toxic or non-toxic types.

Respectfully submitted,

F. A. Olson, M.D., *Secretary.*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

TEN YEARS OF OBSTETRICS AND GYNECOLOGY IN PRIVATE PRACTICE. John L. Rothrock, A.B., M.D., F.A.C.S., formerly Associate Professor of Obstetrics and Gynecology, University of Minnesota. 209 pages. Illus. $3.00. Paul B. Hoeber, Inc., New York, 1933.

The life of any physician whose professional career over many years has been steadily influenced by the best teaching of native and foreign students, and who has used a nice discrimination in adapting methods, points of view and technics into his own practice happily acquires the merit of stimulating and inspiring others. In such a life, Dr. Rothrock has been a scientist in his continuous regard for the classification of his material, while his painstaking care in technic has made him an artist in operative procedures.

From this background, Dr. Rothrock has described his private practice over the decade 1921-31. It is "a clinical report of 1,750 obstetrical and 1,345 gynecological cases, with comparative analyses of many of the larger groups, and detailed case histories of some of the more important and less common conditions." The close relationship between the author and his material, not only in its clinical phases, but in its recording and final statistical analysis, make this book unique in its field.

For the ten-year period described by Dr. Rothrock, the infant death rate in Minnesota was 55.0 and the maternal rate was 5.0; in the United States Registration Area the figures, respectively, were 70.3 and 6.5. Dr. Rothrock's figures are 20.9 and 2.8. A recent study of rates and records of the Maternity Center Association of New York shows a maternal mortality of 2.4 and an infant rate of 28.7. The incidence of stillbirths in Dr. Rothrock's series is 30.2 per thousand births; that of the Maternity Center was 26. The rate for New York City for 1928 was 46. per thousand.

The operative mortality in Dr. Rothrock's series was 0.38 per cent. Greenhill, in reviewing the operative deaths in the Gynecological Service of the Cook County Hospital in the years 1926-30, showed an operative mortality of 3.5. These patients, of course, were all charity, and 50 per cent of them were negroes.

Of the maternal deaths in Dr. Rothrock's series 80 per cent were due to the toxemias of pregnancy. One followed a cesarean, the indication for which was the premature separation of the placenta with concealed hemorrhage, in which the element of toxemia was perhaps present. In other words, toxemia or related conditions accounted for 100 per cent of his maternal mortality. Sepsis, placenta previa and the other common causes of maternal deaths in obstetrics were not absent from this series, but all were so handled as to prevent death of the patient.

Certain clinical procedures are described in detail, for example, the use of the Kielland forceps (pioncered in this country by Dr. Rothrock), the transperitoneal and extraperitoneal cesarean section, and repair of perineal lacerations. In the obstetrical series there were 431 instrumental deliveries with no maternal deaths and 11, or 2.5 per cent, infant deaths, most of which occurred in the author's early use of the Tarnier forceps. The relatively frequent use of instruments is discussed in relation to the size of the infants in the series. The average weight of 1,345 full term babies was 7 pounds, 12.5 ounces (3,529.51 gm.), a figure well above the usual average given from public institutions.

The gynecological conditions are classified in the same careful manner as are the obstetrical. The use of the Alexander operation for retroversion is commended and described, there is an instructive discussion of uterine displacements. Post-operative ileus, of which there were ten occurrences, is discussed in its relation to operative injury incident to relaxation under anesthesia. Enterostomy was used in its treatment with six recoveries and four deaths.

Sound clinical judgment in medicine is a rare and much prized faculty. This volume will indicate why that faculty has been for so long identified with the name of its author.

E. C. Hartley, M.D.

CLASSIFIED ADVERTISEMENTS

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MINNESOTA MEDICINE

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VOL. XVI SEPTEMBER, 1933 No. 9

THE MENACE OF THE TUBERCULOUS TEACHER*

L. S. Jordan, M.D., and K. B. Jordan, M.D.
Granite Falls, Minnesota

IN the routine testing of school children, we are apt to overlook several common, as well as dangerous, sources of infection from tuberculosis. It has been a practice in the past to obtain permission to test school children by the Mantoux method, and allowing the test, in so far as teachers, janitors, etc., are concerned, to be optional. In the light of our present findings, it would appear that the testing of those employed to care for our children during school years should be compulsory, and that no teacher or other employee of schools be given a contract until they have proven themselves physically fit and not a source of danger to the children.

Last March, in one of our neighboring towns, a young man teacher (aged 25) was diagnosed as a far advanced case of pulmonary tuberculosis. The lesion was bilateral, very extensive with cavities, and associated with a tuberculous laryngitis and enteritis. On the day this young man was seen, he having been teaching school that day, his temperature was 103.2, pulse 136, respiration 28, and he had lost some sixty pounds of weight during the last six months. His sputum was laden with tubercle bacilli, and he coughed almost constantly. He was advised to stop work immediately and seek hospitilization. This he did, entering the Sanatorium the next day, which was March 10. He lived exactly three months, dying on June 10, 1933.

As soon as this young man entered the Sanatorium, active work was commenced to determine the number of pupils infected in the school in which he had been teaching. It was learned that in addition to teaching chemistry in high school, he was also music director and had been very active in giving instructions in band and orchestra work, also giving private instructions on wind instruments. In playing wind instruments, there is a constant stream of sputum flowing into the instrument while it is being blown. In teaching a child to play, he would take the child's instrument and blow into it, showing him how to execute a difficult passage. The instrument was then returned to the child, who immediately placed it to his lips, to try and repeat the passage as shown him. In this manner, a definite sputum transfer occurred in every case.

Arrangements were made with the school board so that all pupils in the school were given the opportunity to have the Mantoux test performed, and, if positive, chest films would be taken at the expense of the school board. This was done after it had been explained to the parents and teachers at a joint meeting just what was expected to be accomplished.

Of a total enrollment of 1,304 children, 1,047 were tested. The positive reactors numbered 139, or 13.27 per cent, the percentage being practically the same in the boys (13.29 per cent) as in the girls (13.26 per cent). The above is for the school as a whole.

In the Junior High School, we find the picture slightly changed. In the total enrollment of 189, 14.93 per cent were positive: 12.34 per cent of the boys, and 17.8 per cent of the girls. It will be noted that the percentage of positive reactors was much higher among the girls in Junior High than among the boys.

On testing 426 pupils in the High School, we found 15.72 per cent positive: 14.08 per cent of the girls and 17.9 per cent of the boys. It should be noted that the percentage of positive reactors of boys entering High School was markedly

*Based on recent work done at Riverside Sanatorium, Granite Falls, Minnesota.

lower than that of the girls but that the High School boys reacted in a much higher percentage than the girls.

How can we explain this difference? Let us consider the known contacts with the teacher-bandmaster. The total number of students in the school band which he was training was forty. In testing the band, we found that 33.33 per cent of the boys in the band reacted positively. This is more than a 50 per cent increase in the incidence of infection over the same age group in the High School as a whole. We feel that the answer is obvious.

The incident is cited as but an example, discovered in this state, of the danger of having our school children under the supervision of teachers, janitors, and others over the physical condition of whom we have no check. Dr. J. A. Myers, Dr. F. F. Callahan, Dr. Everett Geer, and Dr. S. A. Slater have all found similar instances in the last several years so that we know that this danger exists in our schools throughout the state.

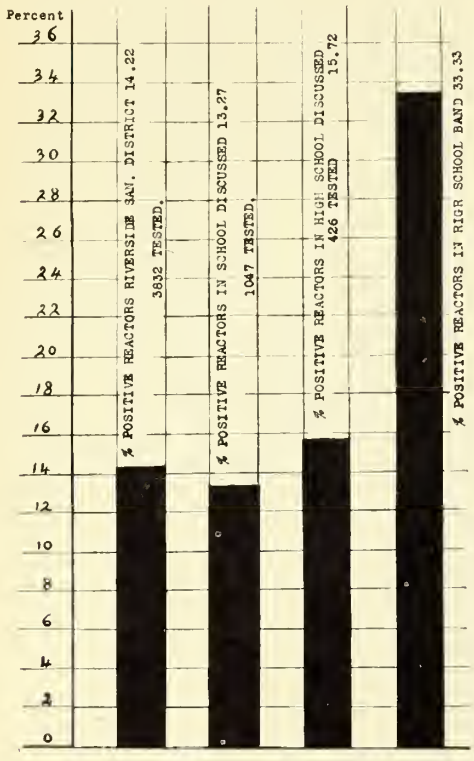


Chart 1. Graphic comparison of positive reactors in sanatorium district to those in school and school band where known exposure occurred.

School boards have the right to require the employees of the school to present suitable health certificates before signing their contracts. In our own district, this has already been accomplished in seven of our larger schools. As to the legality of requiring this work, a favorable ruling has been given us by the Minnesota State Attorney General, Harry H. Peterson. To quote, "The skin test for teachers is reasonable exercise of the police powers of the School Boards if required for the purpose of safeguarding the pupils of Public Schools."

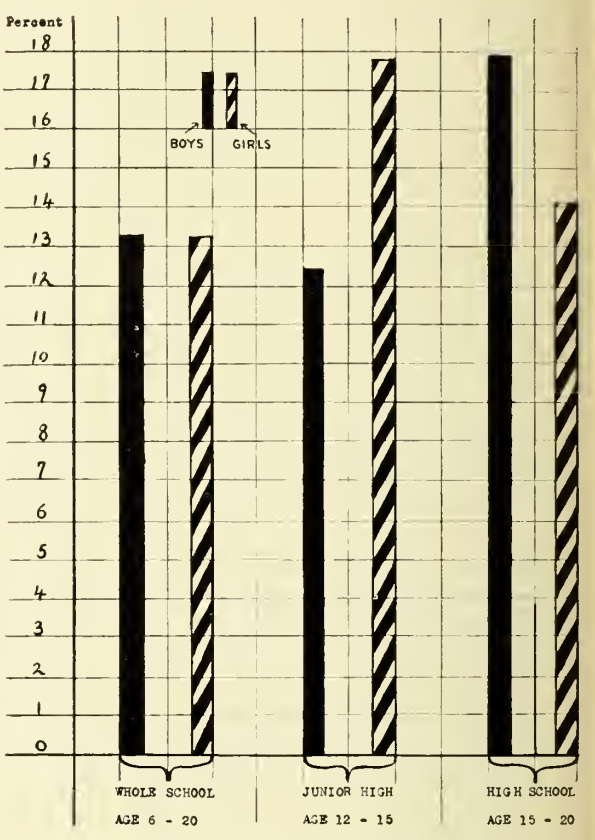


Chart 2. Graphic representation of sex incidence of positive reactors.

We have performed the Mantoux test on 173 teachers and janitors, finding 49 per cent positive, and have made chest films, without testing, on twenty-six more. Five instances of adult type of pulmonary tuberculosis were found. The total net result in relation to actual disease discovered in checking school employees this spring was as follows:

Three active open cases of pulmonary tuber-

culosis in teachers; one far advanced, two moderately advanced.

Active pulmonary tuberculosis, far advanced, in an office girl.

Active pulmonary tuberculosis, moderately advanced, in a janitor.

Two healed cases of pulmonary tuberculosis, adult type, in teachers.

One healed case of pulmonary tuberculosis, adult type, in a school nurse.

In the light of the above findings, we as physicians and guardians of the health of our several communities, have the right to ask our school boards to give us the assurance, that can be easily determined, that, in sending children to school, we are not also inoculating them with tubercle bacilli.

ADEQUATE THERAPY OF SYPHILIS*

S. E. Sweitzer, M.D.
Minneapolis

ANY discussion of what comprises adequate therapy of syphilis must be predicated upon a definite understanding of what such therapy is to accomplish.

The problem is one for the general practitioner in many instances, as cases of syphilis in the rural districts and in the small towns must be treated by the local men, so that an understanding of what is to be accomplished is of the utmost importance.

In many cases the problem is complicated by the unfortunate emphasis placed upon the disappearance of the visible symptoms and the turning of the Wassermann from a positive to a negative. Often when this occurs, both patient and doctor assume a false feeling of security and too often treatment stops right there.

The first thing to emphasize in this connection is the fact that we treat syphilis not only to get rid of the active cutaneous and mucous lesions, but, much more important, we treat the patient to prevent later involvement of the cardiovascular and nervous systems. The smaller the percentage of involvement with these late sequelæ, the better has been the treatment.

Nothing is so fallacious as a quick cure of syphilis. There is no method by which to tell whether or not a patient is cured, as sero-negative Wassermanns and spinal fluids may turn positive unless adequate and long-continued therapy has been given. The annual report of the State Venereal Division shows 720 cases of syphilis reported from clinics. Private physicians reported 407 cases and the Workhouse 77 cases, making a total of 1,204 cases reported in the year 1932.

At the syphilis clinic of the Minneapolis General Hospital there were seen in the year 1932 a total of 396 new cases of syphilis, so that we saw and treated one-third of all the cases in the state for that year. These cases comprised primary, secondary, congenital, visceral, central nervous system syphilis, as well as latent syphilis picked up in the hospital. During the year 23,286 treatments were given. An outline of our procedure may be of interest.

All patients with active lesions are hospitalized. This is done for the protection of the public. They are kept isolated until the open lesions are healed and then treated in the outpatient department.

TREATMENT OF SERO-NEGATIVE PRIMARY SYPHILIS

A positive dark field must be obtained before any treatment is given and then neoarsphenamine is given, starting with 0.3 or 0.45 gm. These are given at intervals of from two to seven days. No doses are given higher than 0.6 gm. Usually four doses are given and the patient is then turned to the outpatient department for bismuth. This is given twice a week for six weeks. A rest of a week or ten days is then followed by another course of four neoarsphenamines and later six weeks more of bismuth.

After one year's treatment some of these patients will be cured, as of course they never have

*From the Minneapolis General Hospital and the Department of Dermatology and Syphilology of the University of Minnesota. Read before the Minnesota Academy of Medicine, at its meeting of April 12, 1933.

a positive Wassermann test nor do they have any other symptoms of the disease while under treatment, but, to avoid the danger of a relapse, a second year of treatment is given.

TREATMENT OF SECONDARY SYPHILIS

This is the same as the sero-negative primary cases except that the treatment is given for three years. Courses are given of four neoarsphenamines and then six weeks of bismuth. Rest periods are at first a week or ten days; later, one month at the end of the first year. In the second year the rest periods are lengthened to six weeks, and in the third year to eight weeks.

Some clinics advocate continuous therapy. Our results are satisfactory to us and the rest periods are a help to the patient. The advocates of continuous treatment claim better results from their form of therapy, fewer relapses and more certainty in getting a permanently negative Wassermann test. This is true only if the rest periods are of long duration. It must be most emphatically emphasized never to give a patient a long rest interval, as often this will lead to relapse and thus negate all that has been done before.

Short rest periods benefit the patient in many ways. It prevents the development of a tolerance for arsenic and bismuth. This tolerance may occur if the drugs are given continuously for long periods. Rest periods also allow the body to eliminate the drugs given and thus do not cause a continuous effect on the liver and kidneys.

During the course of the three-year treatments, Wassermann tests are taken from time to time. Under therapy such as outlined, the blood turns negative in a few months and stays that way.

Before the patient is dismissed a spinal test is taken and, if positive, more active treatment must be given, such as shock therapy or malaria.

TREATMENT OF LATE SYPHILIS

This is practically the same as the secondary cases. Three years of active treatment is given. Potassium iodid is often administered in these cases.

TREATMENT OF WASSERMANN-FAST CASES

These patients are given intensive arsenic and bismuth therapy along with potassium iodid and mercury in some instances. Fever therapy, such as typhoid injections and malaria, are also tried and, we think, with benefit.

TREATMENT OF CENTRAL NERVOUS SYSTEM SYPHILIS

In these cases, if the general condition of the patient warrants, they are given malaria and are allowed to have about eight chills. This is later followed by intensive arsenic and bismuth treatment.

TREATMENT OF VISCERAL SYPHILIS

Syphilis of the liver requires careful handling. Bismuth and potassium iodid are given and arsenic avoided as it has a special affinity for liver cells and may do some damage to the liver.

Cardiovascular cases are a problem in themselves. Treatment should start with potassium iodid and later bismuth should be given for several weeks. Neoarsphenamine can be given after the above, if the patient's condition warrants.

TREATMENT OF LATENT SYPHILIS

Latent syphilis is syphilis with a positive Wassermann and otherwise negative findings. These patients must be treated on their merits. The condition of the patient as regards other diseases must be considered. In latent syphilis, if the patient is in good general condition, a three-year course of arsenic and bismuth should be given.

TREATMENT OF SYPHILIS IN THE AGED

Latent syphilis in the aged should be left alone. Patients with active cutaneous lesions or with visceral lesions should be treated.

TREATMENT OF CONGENITAL SYPHILIS

Congenital syphilis can often be prevented by treatment of the pregnant syphilitic mother. She should be given very energetic treatment of neoarsphenamine and bismuth. Treatment in such cases can be continuous and should be kept up until the birth of the child. In the treatment of congenital syphilis we usually start with sulpharsphenamine 0.1 and give this in the gluteal muscle once a week for four doses. Then mercury rubs are given for six weeks and followed by more sulpharsphenamine. This can be kept up for a year, and in the second and third years bismuth can also be given.

There is a voluminous literature on the results of antisyphilitic treatment. Recently O'Leary and Rogin[2] analyzed 500 cases of central nervous system syphilis and found that only 3 per cent had been treated at all adequately; that is, one to two

years. Ninety-seven per cent either had no treatment or only a few months' treatment. Madden[1] studied 500 cases of late syphilis and found that in only two cases had adequate therapy been given.

In our experience of many thousand cases of central nervous system and late syphilis, we have had findings similar to those of O'Leary and Madden. Personally, I have never seen a case of central nervous system syphilis or of late syphilis in one who had been treated for three years at the beginning of the disease.

COMMENT

The treatment of early syphilis should be active and persistent and should continue for at least three years. The time factor is especially emphasized.

The treatment should fit the patient; not the patient fit the treatment.

Early and long-continued treatment is the only way to prevent cardiovascular, visceral and central nervous system syphilis.

Long rest periods are never to be given.

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THE OCCURRENCE OF TULAREMIA IN MINNESOTA IN 1921: REPORT OF TWO CASES—ONE FATAL WITH NECROPSY REPORT

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A SUFFICIENT number of cases of tularemia (sixty-four§) has now been recorded in the Minnesota State Department of Health to make evident its epidemiologic significance in Minnesota. Two important points, however, still remain: namely, the recording of early, previously undiagnosed cases and the presentation of pathologic data to augment the few reports of necropsy now in the literature. This report supplies both of these features. From the viewpoint of epidemiology, it is imperative that the early previously undiagnosed cases of this disease be recorded, since the sequence of transmission from one region to another, or its long endemic occurrence in any area, may thus eventually become established.

The first case of tularemia of man to be diagnosed in Minnesota was reported by Rutledge in 1927. This, a fatal case, occurred in Becker County in August, 1926. Hanson and Green, in 1929, established that the disease was present in Minnesota as early as 1924. While consideration was being given to cases which occurred in the practice of Hanson, in 1926 and 1927, it was recognized that similar infections had been seen in previous years. On reinvestigation, two of his patients who had been ill in 1924 were found to have given typical histories of tularemia and at the time of reinvestigation still gave positive agglutination reactions for Bacillus tularense. Precedent for this procedure had been established by Francis[4, 5] and Simpson, who had employed this method for the detection of former cases.

We wish to give a record of what is probably the earliest known occurrence of tularemia of man in this state.

In September, 1921, one of us (Hartman) was at Alexandria, Minnesota. At the same place there was an outing party, two male members of which each slightly injured a hand at the same time while repairing a building. About this time,

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§August, 1932.

Hartman returned to his duties at The Mayo Clinic. The members of the outing party stayed at Alexandria.

September 19, one of the two men who had repaired the building appeared at The Mayo Clinic, too ill to walk. He gave the history that on September 15 he had become suddenly ill with chills, fever and sweating. He said nothing of having handled a rabbit, and traced his illness to the wound on the right hand which he had received while he was repairing the building aforementioned. Years later as will appear it became known that he had handled a jack rabbit.

The patient was aged sixty-two years. There was a small, infected laceration on the right index finger, palpably enlarged tender lymph nodes in the right epitrochlear region, and questionably enlarged tender left axillary lymph nodes. There was a somewhat painful pustule on the dorsal aspect of the left hand.

The lesion on the right index finger was incised. Material was obtained from this lesion at the time of the incision, and cultures of it were made on various mediums. No growth resulted. Further local treatment consisted in the application of hot packs to the affected hand and arm.

The patient's condition soon became much worse, the temperature rising to 104° F., and on the third day after admission a culture of the blood revealed the presence of Staphylococcus albus.

On the third day after admission (September 22) the patient's temperature fell rather abruptly to 97° F. and he became delirious. On the following day the temperature rose to 105° F. and for the next few days it fluctuated between 101.5° and 105° F. From the ninth day the temperature ran a fairly steady course between 104° and 105° F. The pulse rate fluctuated with the fever, ranging from 72 to 120 beats a minute. A small amount of albumin and a few granular casts were found in the urine. On the fifth day after admission, leukocytes numbered 12,100 and erythrocytes 3,920,000 in each cubic millimeter of blood. Two cultures of the blood, made just before death, remained sterile.

Death occurred October 3, the fourteenth day after admission and the eighteenth day of the illness. Necropsy was performed six hours after death, at which time the body had not been embalmed.

The diagnosis of tularemia was not made either clinically or at necropsy. At that time the signs and symptoms of the disease were scarcely known, the disease never had been reported from Minnesota, and, as has been said, the patient made no mention of having handled a rabbit. Postmortem changes, even yet, can scarcely be considered definite. Thus the record of the case went into the files of the clinic supposedly as nearly complete as it could be.

In the autumn of 1929, following presentation by one of us (Green) of a paper on tularemia before the International Association of Game and Fish Commissioners in Minneapolis, a member of the Game, Forestation and Park Commission of Nebraska related that he had knowledge of a fellow citizen who had died of a disease such as that described. The disease was supposed to have been contracted in Minnesota in 1921. When the commissioner returned to Nebraska he investigated further, and forwarded the complete story of the outing party, including the incident now to be related.

September 12, before the slight wounds of their hands had healed, the two men who had repaired the building pursued a jack rabbit. The rabbit, scared from hiding, ran a few yards and stopped. A golf club thrown by one of the party hit the rabbit squarely and killed it. Evidently a jack rabbit that can be killed in this manner is ill.) The two men skinned and cleaned the rabbit, and then washed their hands at a pump. It was remarked at the time that the blood of the rabbit had a strange, pinkish color. Since the cooked flesh of the rabbit had a disagreeable flavor little of it was eaten by members of the party. The commissioner also told of the subsequent illness not only of the man whose case has just been reported, but also of the other man who had participated in the skinning and cleaning of the jack rabbit.

The other man had recovered and from him the following report was obtained:

In 1921, this man was twenty-four years of age. On September 14 of that year, two days after the incident of the rabbit, he had become suddenly ill, with chills, fever, and sweating. The perspiration was so intense that the sheets of his bed became discolored. September 17, he had recovered sufficiently to return to his home in Lincoln. By the time he reached there he was again having chills; fever and swelling had ap-

peared in the left epitrochlear and axillary regions. (He had injured his left hand.) He immediately placed himself under the care of Dr. E. B. Finney.

TABLE I.—AGGLUTINATION TEST

Dilution	Four hours incubation	Twelve hours refrigeration
1 to 10	Agglutination partial 3+	Agglutination complete 4+
1 to 20	Agglutination complete 4+	Agglutination complete 4+
1 to 40	Agglutination complete 4+	Agglutination complete 4+
1 to 80	Agglutination partial 3+	Agglutination complete 4+
1 to 160	Agglutination partial ?	Agglutination complete 4+
1 to 320	Negative	Agglutination partial 2+
1 to 640	Negative	Negative
1 to 1280	Negative	Negative
	February 10, 1931	February 11, 1931

The enlarged lymph nodes of the left epitrochlear and axillary regions were incised, following which suppurative and necrotic material drained. About six months later the same lymph nodes again became enlarged and were excised. One year later the right axillary nodes enlarged; they were also excised, after which the patient's health gradually returned to normal.

Through the courtesy of Dr. Finney, a sample of blood was obtained from the living man. Agglutination tests with this blood were positive for tularemia (Table I). The final report was: agglutination complete in a dilution of 1 to 160; partial in a dilution of 1 to 320.

We reviewed the fatal case, including the report of necropsy. Although necropsy at the time of death had been thorough, one of us (Beaver) made new sections from the preserved tissue and studied them. Following is the resultant report.

MACROSCOPIC CHANGES OBSERVED AT NECROPSY

A small ulcerating area was present dorsally, over the distal articulation of the right index finger.

The right epitrochlear and axillary lymph nodes were enlarged and discrete. On palpation the nodes were soft, and on section multiple small grayish-white foci were observed. The foci were composed of softened tissue and appeared as areas of suppuration or as areas of caseation necrosis. Ecchymotic hemorrhagic zones were revealed in other portions of the nodes.

Each pleural cavity contained approximately 500 c.c. of fluid; on the right the fluid was of amber color and cloudy, and on the left it was stained with blood. Fibrinous exudate was present on the visceral pleura of each lung. Throughout the lungs there were multiple firm nodules. These nodules varied from 1 to 4 cm. in diameter. Their consistence was firm and their color gray. They did not contain free pus and appeared to be necrotic, but not soft. The periphery of the nodules was, as a rule, hemorrhagic. Some were raised above the pleural surface as rounded elevations, with a peripheral rim of pleural shrinkage.

The spleen weighed 350 gm. The pulp was dark, purplish-red, and extremely soft. Beneath the capsule and also within the pulp were multiple, white to gray nodules, 1 to 4 mm. in diameter. They were firm, distinctly circumscribed, and presented the appearance of enlarged miliary tubercles or malpighian follicles.

The liver weighed 2,050 gm. It was normal in consistence and color. Rather indistinctly seen beneath the capsule and on the sectioned surface small grayish foci, 1 mm. or less in diameter, were observed.

Cultures obtained at necropsy from the blood of the heart, the spleen and the axillary lymph nodes, revealed hemolytic streptococci, and staphylococcus aureus.

MICROSCOPIC CHANGES

The normal structure of the lymph node was largely transformed by a diffuse inflammatory reaction. Areas of necrosis and zones of cells densely aggregated into small foci were prominent. Lymph follicles as such were not discernible. The lymph sinuses were engorged; lymphocytes, large mononuclear leukocytes, endothelial cells, a few polymorphonuclear leukocytes, and extravasated erythrocytes all contributed to the filling of the sinuses. Blood capillaries, wherever seen, were congested.

Multiple discrete and few diffuse necrotic foci were present in the cortical portion of the nodes. They presented a rather granular, eosin-staining

substance, in which only cellular débris and pyknotic nuclei could be seen. Peripherally well preserved cells were found, circumscribing the lesions or blending imperceptibly into the diffuse foci, but because of the greater extent of the necrosis the cells were barely recognizable. A distinct zonal reaction at the periphery of such lesions was usually absent. These and similar



Fig. 1. Axillary lymph node, confluent focal lesion with central necrosis and peripheral zone of lymphocytes, mononuclear and polymorphonuclear leukocytes, and endothelial cells.

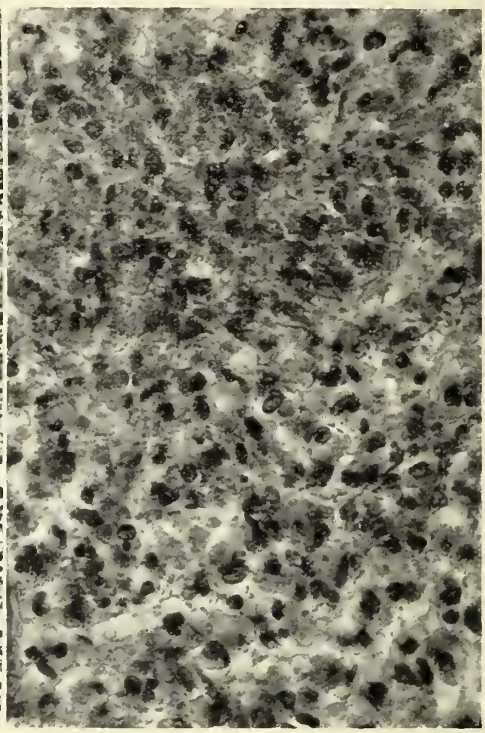


Fig. 2. High power view of tubercle-like lesion (see Fig. 1).

cellular collections which had replaced the normal nodal structure. In this peripheral zone, lymphocytes and large mononuclear leukocytes were easily identified. Many of the latter types were active in the processes of phagocytosis. Around a few of the foci it was possible to identify a zone of endothelial cells and fibroblasts, surounding the outer portion of the lymphocytic and mononuclear leukocytic collections (Fig. 1). In other groups central necrosis was either absent or only beginning. These tubercle-like structures were composed of endothelioid cells and fibroblasts and were sparingly interspersed with lymphocytes and large mononuclear leukocytes (Fig. 2). In the medullary portion of the node the necrosis appeared to be more severe, due to confluence of originally discrete foci; so marked, in fact, that nearly complete necrosis was present. Peripheral reactions were similar to those described for the cortical lesions found in the cortex had many aspects of acute or rapidly progressing caseation as may accompany the tubercles of tuberculosis.

The fibrous and fatty capsule which surrounded the lymph node gave evidence that the inflammatory reaction was not restricted to the node itself. The reaction was diffuse in the fibrous capsule, and just beyond, but in the adipose tissue it followed in the tissue interstices, leaving the cells of adipose tissue intact. Due to less destruction of the fixed tissue and of the exudate in this portion, a better opportunity was afforded for study of the collected cells. Polymorphonuclear leukocytes were rarely seen. The predominating types of cells were identified as lymphocytes, large mononuclear leukocytes and endothelial cells. In many of the large mononuclear leukocytes or endothelial cells the cytoplasm was of a clear (foamy) type. In a few, excentrically placed nuclei, as described in plasma

cells, were observed. In the lymph and blood vessels, contained within the capsular neighborhood, swelling and proliferation of the endothelial cells were prominently displayed. Some of the endothelial cells appeared to be multinucleated (Fig. 3). Proliferation of the lining cells of the vessels at times almost occluded the lumen of vessels (Fig. 4).



Fig. 3. Vessel near axillary lymph node revealing endothelial swelling and proliferation. The cytoplasm is foamy. One of the cells is multinucleated.

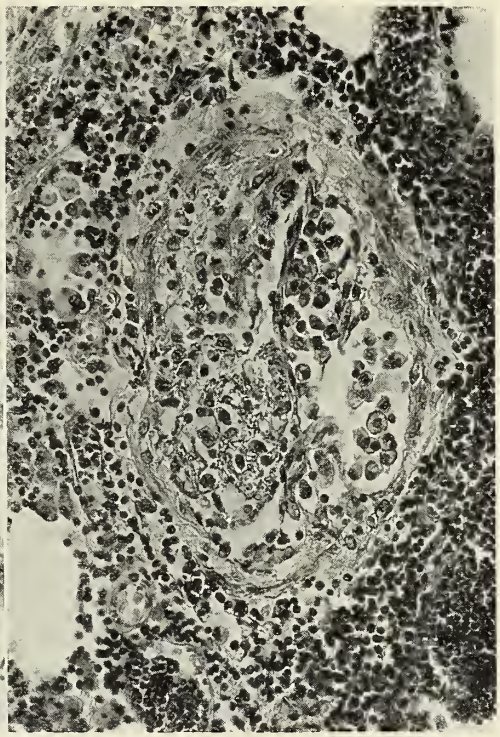


Fig. 4. Vessel near axillary node. Proliferation of endothelial cells has almost occluded the lumen. The cells surrounding the vessel are part of the perinodal exudate.

Many of the larger arteries and veins of this area were thrombosed. The thrombi were composed of layers of fibrin with few leukocytes; this appearance seemed to be distinctive. The walls of the vessels and the contiguous tissues were frequently necrotic.

Giant cells were not observed, either in the lesions of the nodes or in the regions of perinodal inflammatory reaction. Except in one instance, no multinucleated cells were observed. The lesions were essentially avascular, with tendency to thrombosis of vessels and without formation of new capillaries.

Preparations of the lungs, taken from the nodular areas of consolidation, revealed a peculiar type of inflammatory reaction, in which exudative and proliferative features appeared side by side. In some portions necrosis was found as in the nodes, but when present, it was less extensive and less sharply defined. The lesions appeared to be composed of foci of irregular size and shape, with many cells exhibiting pyknotic nuclei, or nuclei in stages of karyolysis or karyorrhexis, interspersed among the living cells, rather than frankly and completely necrotic zones. At times the viable elements were scarcely indentifiable and in such areas much cellular débris appeared. Alveolar and other pulmonary histologic details were never more than suggested within these areas; usually they were entirely obscured by the intensity and completeness of the reaction. Around the zones of intense consolidation the pulmonary alveoli contained polymorphonuclear leukocytes and fibrin with also a variable number of large mononuclear leukocytes. So far as identifiable, the cells of the clearly consolidated areas consisted of endothelial cells and fibroblasts, lymphocytes and large mononuclear leukocytes with only a few polymorphonuclear leukocytes (Fig. 5). The pleura over the consolidated areas was

somewhat thickened from edema, collections of lymphocytes and large mononuclear leukocytes. Considerable fibrin was present on the pleural surface, containing cells similar to those collected beneath. Giant cells were not seen.

peared to correspond with the anatomic situation of the splenic corpuscles, although the foci were also found subcapsular and in the pulp spaces. There was a marked tendency toward necrosis of all of the lesions, and in some this change was

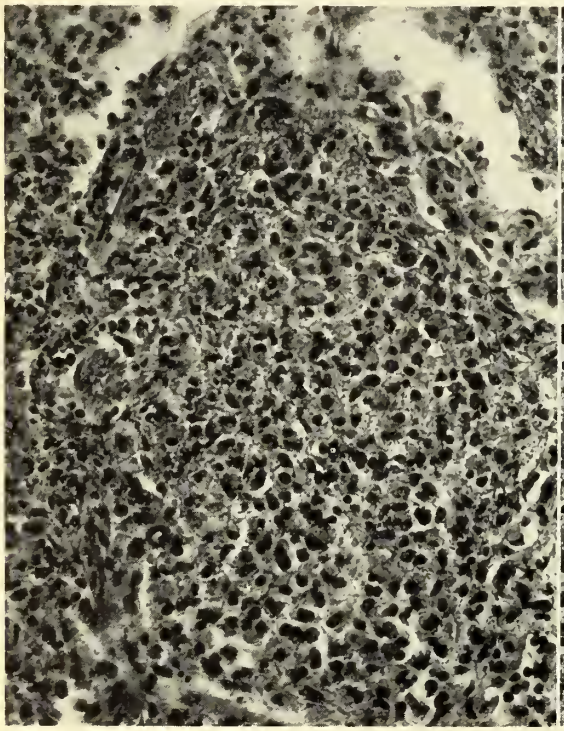


Fig. 5. Lung. Focal lesion composed mostly of lymphocytes and mononuclear leukocytes. Many of the nuclei are pyknotic.

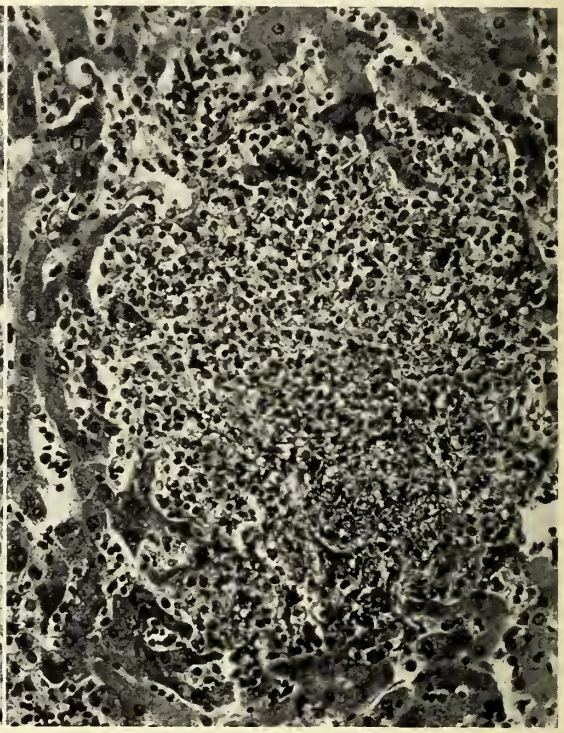


Fig. 6. Focal hepatic lesion. The cellular structure suggests proliferated endothelial cells with a few collected lymphocytes.

The hepatic lesions consisted of miliary, isolated and sharply circumscribed areas of proliferated endothelial cells resembling miliary tubercles. A few lymphocytes were also present. The foci appeared to have considerable fibrin as a framework, into which the lymphocytes were collected, and about which the endothelial cells were proliferating. There was no clearly defined necrotic mass (Fig. 6). The hepatic cells immediately surrounding the lesion revealed simple atrophy with mild fatty or less severe retrogressive changes. Elsewhere in the liver only mild parenchymal retrogressive changes were observed. There was no apparent encapsulation of the lesions. With respect to the lobule the foci were found usually in an intermediate position. Giant cells were not present.

The lesions in the spleen were similar to those in the axillary lymph nodes, though perhaps more discrete. The distribution in many instances apapparently complete. The average lesion consisted of a circumscribed, rounded area in which necrosis, more marked centrally, formed a prominent part. In the necrotic zone only fragmented nuclei appeared. At the periphery of the necrotic foci, more densely revealed than elsewhere in the spleen, lymphocytes and large mononuclear leukocytes were collected. The mononuclear cells were phagocytic for nuclear débris and lymphocytes. Endothelial cells of the splenic pulp generally were more numerous than normally. Sinuses were congested. The splenic capsule adajcent to lesions revealed a fibrinous exudative change, with a few cells, mostly lymphocytes, also present. The lesions were avascular. Giant cells were not found (Fig. 7).

Significant lesions were not observed in other organs.

In addition to the routine hematoxylin-eosin staining, preparations from the various lesions

were also stained for bacteria, by Gram's method (Brown's modification), by carbol-fuchsin and methylene-blue for bacillus of tuberculosis and by Giemsa's method for bacteria. In the Gram-stained sections no bacteria could be identified; stains for the bacillus of tuberculosis were likewise negative. In only one of the Giemsa preparations were bacteria found, this being in a section taken from the lung where a few coccus-like forms were revealed, arranged in clusters or singly and appearing both intracellular and extracellular. The finding of staphylococci and streptococci by cultural methods in this case added to the difficulty of positively identifying these microörganisms.

COMMENT

The cases reported here not only constitute the earliest known occurrence of tularemia in Minnesota, but the fatal case appears to be the first identified case of tularemia in which necropsy has been made, this notwithstanding the fact that complete studies and report of the case will appear more than ten years subsequent to the patient's death, which was in October, 1921.

Francis'[3] comprehensive description of the disease did not appear until 1922. Furthermore, necropsy in a proved case of tularemia of man was not reported until 1924, when Verbrycke described a fatal case; this was approximately three years after the death of our patient. The earlier recording of the infectivity of Bacterium tularense for man, by Wherry and Lamb, in 1914, and by Francis,[1, 2] in 1919 and 1921, had attracted at the time but little interest in the subject. Thus, there was little precedent to follow at the time of the patient's illness and death which could correlate his disease with the descriptions of tularemia which were at that time on record. In addition, the patient's original statements attributed the infection of his finger and subsequent illness solely to the incident of laceration by a rusty nail. Since there was practically no record of the disease except in the experience of Francis, and Wherry and Lamb, it is doubtful if the incident concerning the rabbit would have attracted the attention which it has been found to deserve in the light of subsequent investigations.

When the fatal case was originally studied, the history as then given and the clinical course of the disease, together with the finding of staphylococci in cultures of the blood confirmed by demonstrating staphylococci and hemolytic streptococci in cultures taken at necropsy, seemed to offer an explanation for the illness and subsequent findings at necropsy. It was apparently a case of septicemia complicating a primary cutaneous infection, with secondary pyogenic granulomatous foci disseminated in the lungs, liver and spleen.

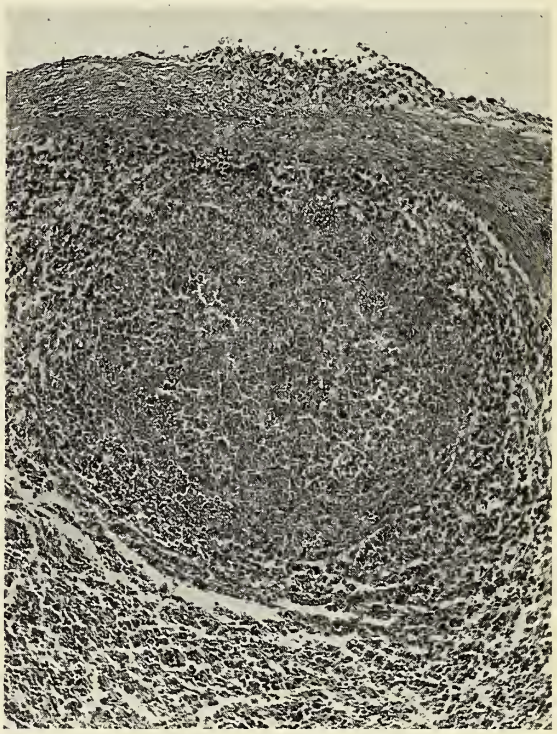


Fig. 7. Focal lesion in the spleen with extension through capsule.

However, in the light of the recently obtained supplementary history and other facts relative to tularemia, which have since then become established, it is clear that the lesions correspond almost exactly to the tissue changes of tularemia. The occurrence of staphylococci and streptococci might be explained on the basis of secondary or terminal invasion, as similar findings were interpreted by Francis and Callender[6] in one of their cases. The fact that the presence of such organisms could not be confirmed by study of tissue stained for bacteria suggests their relative insignificance. In overwhelming infections of this type of either staphylococci or streptococci the organism in the lesions is usually identified with ease. The absence of all types of bacteria, with the exception as already made, in sectioned tis-

sue, stained for bacteria by Gram's, Giemsa's and carbol-fuchsin-methylene-blue methods, also favors tularemia as the type of infection.

Although the histopathologic changes in fatal cases of tularemia have not been considered as essentially pathognomonic in themselves, in the absence of positive laboratory evidence, nevertheless, the constancy of localization of the lesions in certain organs, and the distinctive granulomatous type of inflammation with rapidly developing necrosis, when supplementing a typical history and clinical course, render rather certain the tularemic nature of the infection.

Without serologic and cultural studies and animals inoculations, we necessarily must rely entirely on the pathologic study to confirm the history and clinical studies in the fatal case. The lesions are as characteristic as have been reported in other fatal cases of tularemia.

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HIGH CARBOHYDRATE LOW CALORIE DIET IN THE TREATMENT OF DIABETES MELLITUS*

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I SHOULD like to preface this discussion with the remark that it is not my purpose to criticize or recommend the complete abolishment of the principles of the accepted and generally known types of treatment of diabetes. Rather, it is wished to here present some facts gleaned from over three years' experience with the high carbohydrate low calorie diet; a diet which seems to hold much promise for the treatment of the diabetic in the future. It may be used with no deleterious results to the patient if it is administered by one thoroughly acquainted with this form of treatment.

The idea of giving the diabetic more carbohydrate is not new. Sansum, Geyelin, Joslin, Adlersberg, Porges and others have in recent years advocated this in an attempt to give the diabetic a more normal type of diet. Rabinowitch, I believe, was the first to present a diet high in carbohydrate, low in fat, adequate protein, and a lower caloric intake. This he proposed first in 1930.

What, it may be asked, is the basis for such an apparently radical change? Let us see some of the underlying principles and facts regarding this procedure.

THE THEORY OF DIABETES

The accepted theory of diabetes is that there exists a deficiency in the amount of insulin produced by the Isles of Langerhans. The exact

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cause of this lack of activity is unknown. If the deficiency is due to a lack of function, should it not be possible by stimulation with an increased amount of carbohydrate to increase the amount of insulin produced? Physiologically, this seems reasonable.

FAT METABOLISM

In diabetes we know that the carbohydrates are improperly metabolized, thus causing improper breakdown of fats, with the resultant accumulation of acetone and diacetic acid in the body. These substances give rise to acidosis and finally coma. Why then give a disproportionate amount of fat to the diabetic when it is known that from this source come the toxic substances, rather than from the carbohydrates? The blood cholesterol in diabetes is high, even though it is controlled by the low carbohydrate high fat diet. Some writers, *i.e.*, Rabinowitch, Dyke and Sansum, have suggested that the high blood cholesterol may be a factor in the production of arteriosclerosis in the diabetic. Diabetes and arteriosclerosis, together or alone, tend to occur in patients past middle age. Conclusions might be drawn then that age, not diabetes, is responsible, but the diabetic shows a greater incidence of arteriosclerosis than the non-diabetic in any age group. It has been observed that arteriosclerosis tends to occur in all diabetics not properly controlled within not more than five years after the onset of the disease.

On the low fat regime one sees a lowered blood cholesterol and White has shown that the development of arteriosclerosis even in children tends to increase in frequency with a hypercholesteremia.

Coma is a rare condition when patients are strictly following the new régime. Barach, who uses a high carbohydrate moderately low fat diet, states he has seen only one case of coma, this in a patient who admitted dietary indiscretions.

RESPIRATORY QUOTIENT IN DIABETES

Some critics of the high carbohydrate low calorie diet suggest that it may put additional strain on the insulin producing mechanism of the body. Rabinowitch has shown that the respiratory quotient remains almost unchanged when patients are put on a high carbohydrate diet, indicating that the total amount of sugar given per day is being completely oxidized during the same period, leaving none for storage. Thus we see little, if any, strain on the insulin producing mechanism. The foregoing fact is considered as extremely important.

PATHOLOGY OF DIABETES

Pathologists tell us that they find varying degrees of pancreatic involvement in diabetes. The number of the secreting acini may be diminished or the acini present may present various degrees of hyalinization and cellular infiltration. Various authors give the incidence of pathology from 50 per cent to 80 per cent. These cases, however, have been clinically diagnosed diabetes when the pathologist makes his examination. Barron recently pointed out that one may find the pancreas almost wholly destroyed with no signs of diabetes, or it may be but little if any affected in severe diabetes. On this basis, one may ask if diabetes is due altogether to a deficiency in the amount of insulin, or if it is due in part to the failure of the body to properly utilize the insulin that is present.

THE EFFECT ON GLUCOSE TOLERANCE AND BLOOD SUGAR

It is known that normal individuals, placed on a high fat diet with little if any carbohydrate, will, if given a glucose tolerance test, show a diabetic curve. In experimental work at the University of Minnesota Health Service it has been found that certain individuals who are mild diabetics or have disturbed glucose metabolism will, on a high carbohydrate low fat diet, improve their ability to handle glucose. This is not due to the fact that the patients lost weight, as in some cases there has been a gain in weight. Thus, while Rabinowitch has not stated that the tolerance for glucose is truly increased on this diet, from the following cases one might infer that this may occur.

Case 1.—D. R., male, aged twenty-six. In November, 1925, he had a sudden onset of weakness, polyuria, loss of weight. Glycosuria was present and a diagnosis of diabetes was made. At this time a diet of carbohydrate 40 grams, fat 250 grams, and protein 40 grams was given. Ninety units of insulin a day were necessary. Since 1927, the insulin dosage has been 100 units a day and a comparatively low carbohydrate high fat diet taken. He presented himself for treatment at the Students' Health Service on May 10, 1932.

TABLE I

Date	Fasting Blood Sugar†	Diet C	F	P	Insulin daily	Weight	Remarks
5/10/32	245 mgms./100 c.c.	275	56	78	100 units	204½	Started
2/19/33	167 mgms./100 c.c.	275	56	78	105 units	214	vacation
3/ 3/33	227 mgms./100 c.c.	275	56	78	105 units	.....	
4/18/33	123 mgms./100 c.c.	275	56	78	100 units	218	

TABLE II

	5/10/32	3/3/33
Fasting Blood Sugar	245 mgms./100 c.c.	227 mgms./100 c.c.
½ hour after drink	418 mgms./100 c.c.	287 mgms./100 c.c.
1 hour after drink	498 mgms./100 c.c.	321 mgms./100 c.c.
2 hours after drink	565 mgms./100 c.c.	315 mgms./100 c.c.
2½ hours after drink	500 mgms./100 c.c.	307 mgms./100 c.c.

TABLE III

Date	Fasting Blood Sugar	Diet C	F	P	Insulin daily	Weight	Remarks
1/28/32	215 mgms./100 c.c.	100	175	80	30 units	154	
6/11/32	217 mgms./100 c.c.	214	56	60	55 units	150	Cold
11/23/32	159 mgms./100 c.c.	214	56	60	50 units	151	
2/23/33	114 mgms./100 c.c.	214	56	60	45 units	153¾	
3/ 2/33	91 mgms./100 c.c.	214	56	60	40 units	154½	

TABLE IV

	3/2/32	3/2/33
Fasting Blood Sugar	193 mgms./100 c.c.	91 mgms./100 c.c.
½ hour after drink	273 mgms./100 c.c.	157 mgms./100 c.c.
1 hour after drink	273 mgms./100 c.c.	.....
2 hours after drink	380 mgms./100 c.c.	285 mgms./100 c.c.
2½ hours after drink	433 mgms./100 c.c.	280 mgms./100 c.c.

TABLE V

	C	F	P	Cal.	Insulin Units	Blood Sugar	Blood Cholesterol
Old Diet	84.5	146	53	1864	34.5	169.8	.2778
New Diet	227	56	70.5	1694	26.5	157	.1888

Table I shows the relation of blood sugar, diet, insulin dosage and weight since being treated on the high carbohydrate low calorie diet.

One sees the tendency is gradually toward a more normal blood sugar and no increased insulin dosage.

Table II records sugar tolerance tests before and eleven months after the high carbohydrate low calorie diet was instituted.

Table II shows a definite chemical improvement in tolerance. The patient is still a diabetic but is able to metabolize glucose much more effectively.

†Blood sugar determination on venous blood by the Gibson modification of the Folin-Wu method.

The second case demonstrates what may happen to the glucose tolerance of a diabetic and the length of time it may take to adjust the patient to a high carbohydrate low calorie régime.

Case 2.—G. O., female, aged twenty-two years. This patient was diagnosed a diabetic in 1924. She was treated first on the high fat low carbohydrate diet with no insulin. During the next few years insulin was used, and when first seen at the Students' Health Service the patient was taking 30 units of insulin a day and was on a diet of carbohydrate 100 grams, fat 175 grams, and protein 80 grams. Her weight was 155.5 pounds.

Table III is a chart giving the relations of fasting blood sugar, diet and insulin.

One seeing the chart (Table III) might say this demonstrates that insulin must be increased,

but certainly the patient on carbohydrate 100 grams, fat 175 grams, and protein 80 grams, with a fasting blood sugar of 215 mgms., would have required at least 15 or more units of insulin to bring her under control.

I should like also to present the sugar tolerance curve on this patient when treatment was instituted and one year later (Table IV).

Certainly chemically this patient has increased her ability to metabolize carbohydrates. The carbohydrate in the diet was increased 114 grams and the insulin increased only ten units. At the end of a year her blood sugar values are generally much lower. A number of cases not so severe are being studied at the Students' Health Service and from present indications it seems that if the disturbed sugar tolerance is diagnosed early enough, diabetes may be prevented.‡

EFFECT ON INSULIN CONSUMPTION

Rabinowitch has shown that in the greater number of cases, insulin consumption has not markedly increased and may decrease when a change from the high fat low carbohydrate diet is made. Our experience, while much less than that of Rabinowitch, is practically the same. Below are results averaged from ten cases of Rabinowitch's showing the relation of diet to insulin consumption, blood sugar, and cholesterol on the old and new types of diet.

It is interesting to note that while the average carbohydrate intake has been increased more than two and a half times, the average insulin dose has decreased eight units. The average blood sugar has decreased from 169 to 157 mgms./100 c.c., and the blood cholesterol from 277 to 188 mgms./100 c.c. It has been stated in some of the recent literature that these patients require an increased amount of insulin but no actual data has been given to substantiate this assertion. It is candidly admitted that the insulin dosage may increase 30-40 or more units when a sudden change in dietary regime is made, but if cases are followed for a sufficient length of time it will be found that little increase in insulin is necessary in most cases, and there may be an actual lowering of insuline dosage (Table V). Hence, these patients should not be more susceptible to insulin reactions than those on the low carbohydrate diet.

‡This study will be reported later.

ADAPTABILITY OF THE DIET

In a recent publication it was stated that in a number of hospitals the average diet of internes and nurses in most institutions is somewhere between 125-140 grams of carbohydrate, about 100-200 grams of fat, and 65-90 grams of protein. The source of this information was not quoted. At the University of Minnesota Hospital the diet for nurses and internes was 255-300 grams of carbohydrate, 90 grams of fat, and 72-76 grams of protein for a given period. The usual diet contains less fat and more carbohydrate, according to a personal communication with Miss Gertrude Thomas, head of the Dietetics Department of the University Hospital. It will be seen that in the high carbohydrate low fat regime one would only have to restrict the above normal diet three pats of butter a day and it would be satisfactory for this type of treatment. The desirable distribution of calories in the food is approximately 10-14 per cent protein, 30-31 per cent fat and 55-60 per cent carbohydrate. It is obvious that an institution is forced to feed a high carbohydrate low fat diet because of economy. Butter, cream, etc., are much more expensive than carbohydrates. Patients have also told me the money they save by not buying glutein bread, special flours, saccharine, etc., is far more than the money expended for the increased insulin if it is needed.

The diet is a boon to the diabetic that must eat away from home, such as business men, salesmen, engineers and students, as it requires no special preparation.

HIGH CARBOHYDRATE DIET AND ITS RELATION TO SURGERY

The successful outcome of surgical procedures upon diabetic patients depends not alone upon the skill of the surgeon but equally on the medical management of the disease. The high carbohydrate in the diet fits in well with the management of the diabetic needing surgical attention. It enables intravenous glucose therapy with no great danger and, because there is little fat in the diet, coma is not so prone to occur. In treating convalescents from surgical procedures, the high carbohydrate intake also makes for a more palatable diet.

HIGH CARBOHYDRATE DIET AND ITS RELATION TO MEDICINE

In acute infectious diseases such as pneumonia,

diphtheria, scarlet fever and others, one strives to give the patient readily utilizable calories. This is best supplied by fruit juices and carbohydrates. One can hardly imagine a diabetic ill with pneumonia relishing the idea of drinking half a glass of cream. Glucose provides calories that may be utilized immediately after absorption. The high carbohydrate intake enables one to follow the patient's régime with ease. The fact that the patients show glycosuria with any acute infection is not paramount, rather the presence of diacetic and acetone should be the warning signal. These tend to occur more frequently on the high fat diet. Not in two years has any indication of acidosis been noted in diabetics at the Students' Health Service, even though they have infections.

THE DIET MANAGEMENT

The diet the patient is first placed on is called the basic diet; it consists of 56 grams of carbohydrates, 56 grams of fat and 42 grams of protein. Gradually the diet is built up by adding carbohydrate and protein until the patient is taking enough calories to maintain a normal or slightly under normal weight and enable the patient to carry on with his or her occupation. Rabinowitch has described the exact technic of this regime in detail elsewhere. No scales are used; wood blocks representing pieces of bread, meat and butter are given the patient. The average daily diet for a patient on the high carbohydrate, low fat regime is given below.

Breakfast	Lunch	Dinner
1 orange, apple or grapefruit 1 egg—prepared in any form (no extra butter for frying) 2 slices of toast 1 portion of butter ½ glass whole milk (4 oz.) 4 heaping dessertspoonfuls of oatmeal (uncooked) 3 teaspoons of sugar for cereal Coffee or tea	Bouillon (fat-free) 1 portion lean meat or fish (1½ oz.) 2 portions of vegetables from list allowed 2 slices of bread 1 medium size potato 1 portion of butter 1 portion of fruit from list allowed Tea or coffee, with milk as at breakfast	Same as lunch with substitutions of various meat, vegetables and fruits.

While the foregoing appears to be a large intake of food, the content is in reality about 272 grams carbohydrate, 56 grams fat and 78 grams protein. The total caloric intake is 1,904 for the day. Various substitutions may be made in the source of the carbohydrate so that the patient may enjoy almost anything he desires.

Mentally, the diabetic patient has a different outlook on life than a normal individual. He usually is not seriously ill or incapacitated but must of necessity follow a diet and take insulin.

The physician prescribing a diet in grams of food to be eaten, unless affected himself, does not realize the problem that confronts the individual who must interpret and follow these figures. One should not advise patients financially unable to buy special more expensive foods. Financially embarrassed patients receiving aid must of necessity confine their purchases to the cheaper foods. If the diet is not so correlated these people cannot follow it; they become discouraged, and lose contact with their physician.

It should be remembered also that these individuals may have an invalid reaction when thrown into an unpleasant situation if the physician is not wise in his counsel.

The diabetic child presents even a more complicated problem. Not only must the child be taught the principles of diabetic care and given as near a normal diet as possible, but also we must guard against feelings of inferiority and insufficiency. Children are not as tolerant of illness as are adults. The temptation to regard the diabetic child as a "freak" may develop and thus cause the child's withdrawal from healthy associations. Too often the family unconsciously assume the attitude of martyrdom toward the child who makes it impossible for them to travel and do other things normally enjoyed by families with healthy children. To prevent this the physician must treat the diabetic patient as well as diabetes.

Recent lessening of dietary and exercise restrictions have tended to give the diabetic child a healthier outlook in life for the future. It is interesting to note at the present time an effort is being made to establish a diabetic boys' camp

in northern Minnesota where the child may fish, tramp, canoe, learn woodcraft and play under competent medical and dietetic supervision. This is a step in the right direction.

SUMMARY

An attempt has been made to show some of the principles behind the high carbohydrate low calorie diet. The fact that there is no change in the respiratory quotient indicates no increased strain on the insulin producing mechanism of the body. The diet does show in some cases an improvement of tolerance while insulin consumption does not increase and the blood sugars and cholesterols tend to be normal. With little fat in the diet the formation of acetone bodies does not tend to occur.

The patient must be warned to strictly adhere to this diet if good results are to be obtained.

With more physicians using this type of treatment and recording data one should in the next few years prove or disprove its validity. The use of this diet in general practice where minimal laboratory facilities are not available is as yet deemed inadvisable.

CONCLUSIONS

On the high carbohydrate low fat diet:

1. The management of the surgical or medical diabetic case is facilitated.
2. The food cost is not as great, the diet is more palatable, is more adaptable than the high fat low carbohydrate treatment.
3. One has failures in this type of treatment as in any other (16 in 516 cases of Rabinowitch).
4. The patient should be treated over a period of six months to one year before the diet should be discarded as unsuccessful.
5. Patients must be extremely reliable before being given this diet.
6. The results of experience with this diet raise the question as to whether insulin deficiency is alone responsible for diabetes mellitus.
7. Insulin consumption is usually not markedly increased and may actually be decreased.
8. Glucose tolerance tests indicate, in some cases, an increased ability to metabolize carbohydrates. In the future we may by early diagnosis of a disturbed tolerance be able to prevent diabetes from developing.
9. Respiratory quotients show no marked change, indicating no increased strain on the insulin producing mechanism of the body.
10. Coma and acidosis are uncommon complications.
11. Blood cholesterol tends to be within the limits of normal and may be the means of preventing premature development of arteriosclerosis in the diabetic.
12. Blood sugars do not tend to increase.
13. The diabetic patient and the disease should both be treated.

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GENERAL, LOCAL, SPINAL AND BALANCED ANESTHESIA*

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IN the last few years, several new anesthetic agents and methods of administration have been recommended to the medical profession. Enthusiastic reports may have encouraged the use of such agents and methods beyond the point of their optimal application. It is desirable that these be considered from time to time in relation to the older and well established agents and methods, so that the advantages and disadvantages of each may be generally recognized. I have prepared tables based on personal experience, in which attention is called to the pharmacologic effects of several of the anesthetic agents (Tables I, II and III), their methods of administration, and their application to patients of varying physical condition and age, and who have various diseases. "Anesthesia" and "analgesia" are here used in the strictest meaning of the words; that is, anesthesia is the loss of all sensation and analgesia the loss of pain only. These are necessarily considered apart from relaxation and quiet respiration in order to understand better the advantages and disadvantages of the agents and methods to be considered. Chloroform and ethyl chloride have been omitted, because enough other agents and methods are now available. The barbiturates and tribromethyl alcohol (avertin) are considered only from the standpoint of production of basic anesthesia, or in still smaller doses as preoperative medicaments instead of in doses large enough to produce surgical anesthesia.

Colonic oil-ether (40 per cent ether and 60 per cent oil) is used in labor, largely as a basic anesthetic, to be supplemented as necessary. Any methods in which small, safe doses of an anesthetic or anesthetics are used together, by various methods, tend to advocate the idea of combined or balanced anesthesia (I introduced this term at a meeting of the Ramsey County Medical Society, December 10, 1925), and in general are relatively safe. The expression "ether, administered by the semi-open drop method," indicates that ether was dropped on the mask, with more or less rebreathing. The word "gases" refers to nitrous oxide or ethylene; "barbiturates," to pentobarbital sodium (nembutal) and sodium amytal. Spinal anesthesia (technic presented in the motion picture) is accomplished with procaine, using about 1 mg. for each pound of body weight, not exceeding 200 to 250 mg., and injecting a solution of usually 3, 4, or 5 per cent, in a lumbar interspace at the rate of 0.5 c.c. each second. The term "block anesthesia" refers to various types of regional anesthesia, such as sacral block (technic demonstrated in the motion picture), brachial plexus block, cervical block, and field block. Infiltration anesthesia indicates that the tissue to be incised was infiltrated with the anesthetic solution. The term "combined" or "balanced" anesthesia refers to the use of safe doses of preliminary medicaments, followed by use of a local anesthetic agent, whether administered by infiltration for block anesthesia, or for spinal anesthesia, and supplemented with a general anesthetic or anesthetics such as nitrous oxide, with sufficient oxygen adequately to support metabolism and a small amount of ether if necessary. There are innumerable possible combinations, but so long as a safe dose of each agent is used, it falls into the class of balanced anesthesia.

In choosing the agent or agents, and the method of administration, it is well to avoid a routine method, unless it is based on the principle of a balanced or combined anesthesia. When the intratracheal method is mentioned it has to do with the Magill technic of using soft rubber tubes of large bore, which provide a clear, adequate airway and facilitate administration of the anesthetic as well as providing adequate pulmonary ventilation and quiet respiration. The technic has been demonstrated in the motion picture.

Obviously, the pharmacologic effects in Table II are difficult to modify, whereas in Table III are presented some of the factors which modify the effect of a given agent, and one's choice is thereby influenced. Other factors which influence a

*From the Section on Anesthesia, The Mayo Clinic, Rochester, Minnesota. Read before the meeting of the Ramsey County Medical Society, St. Paul, Minnesota, February 27, 1933.

TABLE I. PHARMACOLOGIC EFFECTS OF MOST COMMONLY USED ANESTHETIC AGENTS

	Block*	Infiltration*	Spinal**	Inhalation and insufflation		Barbiturates***	Avertin***	Combined or balanced anesthesia*
				Drop ether**	Gases** (with or without ether)			
Anesthesia	Yes	No	Yes	Yes	Yes	No	No	Yes
Analgesia	No	Yes	Yes	No	Yes	Yes	Yes	No
Relaxation	Yes	No	Yes	Yes	No	No	No	Yes
Quiet respiration	Yes	No	Yes	No****	No****	Yes	Yes	Yes
Prompt recovery of reflexes	Yes	Yes	Yes	No	Yes	No	No	Yes
Untoward immediate results	No	No	Yes	No	No	No	No	No
Untoward remote results	No	No	?	Yes	No	Yes	Yes	No

*Definite effect from preliminary medication.
**Mild effect from preliminary medication.
***Mild effect from preliminary medication; used intravenously or rectally as a basic anesthetic.
****With intratracheal anesthesia, yes.

TABLE II. SAFETY OF VARIOUS ANESTHETIC AGENTS AND METHODS (PATIENTS ALL IN FAIR OR IN GOOD CONDITION)*

Complicating disease or condition, or organs operated on (patients all in fair or in good condition)	Drop ether	Gases**	Barbiturates***	Avertin***	Spinal	Block	Infiltration
Very young, 4 years or less	Yes	Yes	No	No	No	No	Yes
Very old, 75 years or more	No	Yes	No	No	No	Yes	Yes
Pulmonary disease	No	Yes	No	No	Yes	Yes	Yes
Marked cardiac disease	Yes	Yes	Yes	Yes	No	Yes	Yes
Diabetes	No	Yes	Yes	No	Yes	Yes	Yes
Marked vascular disease	Yes	Yes	Yes	Yes	?	Yes	Yes
Disease of colon	Yes	Yes	Yes	No	Yes	Yes	Yes
Intestinal obstruction	No	Yes	No	No	Yes	Yes	Yes
Kidney	No	Yes	No	No	Yes	Yes	Yes
Genito-urinary tract	No	Yes	Yes	Yes	Yes	Yes	Yes
Stomach	Yes	Yes	Yes	Yes	No	Yes	Yes
Liver, gallbladder or bile ducts	Yes	Yes	No	No	?	Yes	Yes
Appendix	Yes	Yes	Yes	No	Yes	Yes	Yes
Goiter	No	Yes	Yes	No	No	No	Yes
Normal labor	Yes	Yes	Yes	No	No	No	No
Operative obstetrics	Yes	Yes	Yes	No	Yes	Yes	Yes

*Balanced or combined anesthesia is safe in any of these conditions. Yes, indicates that the agents used are safe; no, that they are not safe.
**Either nitrous oxide or ethylene, depending on whether one must avoid an inflammable gas, and with or without ether.
***Used intravenously or rectally as a basic anesthetic.

choice are the availability of the agent, the skill of the anesthetist, and the personal preferences of the surgeon and patient. In some cases there may be no possibility of exercising a choice. Ordinarily, however, a wider choice exists now than before. In the use of preliminary medicaments it is well to consider elimination of fear, apprehension and unrest on the part of the patient. This can be done in various ways, an example of which is to give pentobarbital sodium (nembutal) grain 1½ (0.1 gm.) at bedtime the night before operation, to repeat the dose by mouth and give a hypodermic injection of morphine grain 1/6 (0.01 gm.) and atropine grain 1/150 (0.0004 gm.) about an hour before the operation. For large and very nervous patients, grains 3 (0.20 gm.) of pentobarbital sodium may be used with the hypodermic injection of morphine and atropine.

TABLE III. SAFETY OF VARIOUS ANESTHETIC AGENTS AND METHODS (PATIENTS DEBILITATED)*

Complicating disease, condition, or organ operated on (patients debilitated)	Drop ether	Block	Infiltration
Very young, 4 years or less	Yes	No	Yes
Very old, 75 years or more	No	No?	Yes
Pulmonary disease	No	Yes	Yes
Marked cardiac disease	No	Yes	Yes
Diabetes	No	Yes	Yes
Marked vascular disease	No	Yes	Yes
Disease of the colon	No	Yes	Yes
Intestinal obstruction	No	Yes	Yes
Kidney	No	Yes	Yes
Genito-urinary tract	No	Yes	Yes
Stomach	No	Yes	Yes
Liver, gallbladder or bile ducts	Yes	Yes	Yes
Appendix	No	Yes	Yes
Goiter	No	No	Yes
Normal labor	Yes	No	No
Operative obstetrics	Yes	Yes	Yes

*Balanced or combined anesthesia is safe, as are the gases. In these patients the barbiturates, tribromethyl alcohol (Avertin) and spinal anesthesia are best avoided. Yes, indicates that the agents used are safe; no, that they are not safe.

For some patients it is advisable to omit the hypodermic injection of morphine and atropine, especially if ether is to be given by the open drop method.

In labor, pentobarbital sodium may be given in doses of 3 grains when the cervix is dilated about 4 cm., and the dose may be repeated in an hour or two if necessary, followed by a general anesthetic for delivery of the head over the perineum. Since the barbiturates have an antispasmodic effect, it is well to use them as preliminary medicaments before the use of a local anesthetic agent.

The use of ephedrine for the maintenance of blood pressure during spinal anesthesia should be gauged so that the blood pressure will not be elevated. In the average case 25 to 50 mg. of ephedrine is sufficient. If the patient is excited, even these doses may be too large. The duration of anesthesia may be lessened if the blood pressure and pulse rate are increased so that an increased amount of a general anesthetic will likewise be required; therefore the period of induction may be prolonged. Ephedrine can be given intravenously when it is needed, but cannot be withdrawn and should be used conservatively and not in a set dose or at a set time. In an emergency, when soluble barbiturates are given intravenously to debilitated patients, a small amount of ephedrine may be admixed and the two drugs administered together. Blood pressure is then sustained. The concentration in the solution is ephedrine 2.5 mg. for each cubic centimeter, sodium amytal 0.10 gm. (1½ grain) for each cubic centimeter.

THE ROENTGEN TREATMENT OF PLANTAR WARTS

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A WART on the sole of the foot may cause pain and disability that are entirely out of proportion to the size of the lesion. It is a condition that occurs among healthy adults, and most often affects those who do much standing and walking. Pressure is a factor in the production of pain. Often patients attribute the pain to a nail in the shoe. The disability is very marked, not only as a result of the disease but also because many of the methods of treatment are in themselves crippling for a time. One of our patients stated that he had had his great toe amputated in order to gain relief. Obviously, the disease is important from an economic standpoint.[4]

Verruca vulgaris and plantar wart are the same entity occurring on different parts of the body. Plantar warts vary in size from that of a pin point to about 1.5 cm. in diameter. The cause is generally said to be a filterable virus, and mild contagiousness is tacitly accepted.[6] Many of these warts occurred among people who worked where there were tiled or cemented floors, which are more resistant than wood or linoleum. Many patients wore very thin-soled shoes or sneakers.

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The diagnosis of this condition is not difficult, but the lesion may be overlooked if it is very small. A plantar wart consists of papillomatous hyperkeratosic lesions arranged in verrucous form, surrounded by hyperkeratosic skin. They are usually situated in the heel, the metatarsal pads or the ball of the toes. On paring the top the translucent wart is seen, with brownish black dots in its center. A plantar wart is well defined, papillomatous and brownish, whereas a callus is more diffuse, smooth and yellow. Occasionally hypertrophic trichophytosis involves the soles of the feet and resembles a plantar wart. The former is characterized, however, by a greater amount of desquamation and many more cracks and fissures. Although the presence of Trichophyton in these lesions is not easily demonstrable, the organisms are almost always present in scrapings taken from between the toes.

Methods of treating this condition include the local application of acids, castor oil, corn-plasters or salves. Attempts are also made to destroy the wart by the electric needle or by excision. The efficiency of these methods cannot be judged here, except in cases in which they have previously failed, and the patients came to the clinic for roentgen treatment.

The first recorded instance of successful treatment of plantar warts with radiation was in 1912.[2] MacKee treated the warts successfully with roentgen rays in 1915. This form of treatment has not had the popularity it deserves, but during the last few years it has become more general.

This report is based on 100 consecutive cases of plantar wart in which the end-results of roentgen therapy could be studied. Thirty-one of the patients were males and sixty-nine females. Their ages varied from five to sixty-six years, with an average age of thirty years. The incidence by decades of life was as follows: In the first decade, one case; in the second, twenty-four cases; in the third, thirty-five; in the fourth, seventeen; in the fifth, twelve; in the sixth, ten, and in the seventh one case.

We found only one wart in each of sixty-seven cases, whereas multiple plantar warts occurred in thirty-three. Forty-three patients had the lesion on the right foot, forty-two on the left, and fifteen on both feet. The wart was known to have been present in sixty-eight cases as follows: for less than one month in four cases; for one month to six months in thirty-six; for six months to one year in thirteen, and for one year to twenty years in fifteen. None of these patients reported the spontaneous disappearance of a plantar wart.

Before roentgen treatment is given at The Mayo Clinic a chiropodist pares off the superficial keratosic layers, thus making unnecessary the higher kilovoltages and filters. The area to be treated includes only the wart, care being taken to protect all tissue up to the margin of the lesion. The wart is stained with an indelible pencil to facilitate recognizing its edge. A small hole is punched in a piece of lead foil 1 mm. thick. This hole is enlarged by rotating a sharpened pencil through it until the size of the hole is the same as that of the wart. The patient is then placed in a position most advantageous for exposure, usually on the side or prone. The knee and foot are extended or flexed as required for comfort and for good exposure of the lesion. The foot and leg are then supported with pillows and sandbags, so that no effort is necessary to hold the member perfectly still. The lead foil is carefully strapped to the foot with adhesive tape; lead rubber is used to protect the outlying regions. The roentgen-ray tube is then carefully centered at the exact distance desired.

A mechanical rectifier and Coolidge tube are used. Low voltages, 80 PKV and 100 PKV, without filter, are most frequently employed; 100 PKV or 110 PKV are occasionally used with 2 mm. aluminum filter, and 135 PKV with 4 mm. aluminum filter for the rare, large, infiltrating lesions. The focal skin distance used is 9, 12, or 16 inches. The time is changed proportionately. The milliamperage employed is 5, 6, or 8. The total dose varies greatly from less than ⅔ S.E.D. to 5 S.E.D. (192 r to 1848 r*). In one technic frequently employed we use 80 PKV; 16 inch distance, 6 milliamperes, 12 minutes, no filter (2 S.E.D., or 750 r). In another technic the factors are 100 PKV, 9 inch distance, 8 milliamperes, 4 minutes; no filter (3½ S.E.D., or 1344 r). After the treatment is given, the chiropodist often puts a pad around the wart to relieve pressure. This pad is changed twice a week, and 20 per cent ichthyol (sulphonated bitumen) in lanolin is often employed to keep the tissue soft. With lighter doses the treatment is repeated at intervals of one or two weeks for two or three times, but when the heavy doses are used

*Skin erythema dose is 375 r measured in air with no back scattering.

TABLE I. NUMBER OF TREATMENTS GIVEN; DOSAGE USED

	Treatment					Skin erythema dose							
	1	2	3	4	Total	1	1½	2	2½	3	3½	4	4½
Cured	55	15	5	1	76	2	30	2	8	7	21	1	5
Cured but a new wart developed	3	2		1	6		1		1	1	2	1	
Failed	5	2	1		8	1	3	1		1	1		1
Failed, but with symptomatic relief		3	1		4		1			1	1	1	
Questionable results	5	1			6	2	1			2		1	
Total					100	5	36	3	9	12	25	4	6

the treatment is not repeated before two months, and then only once if indicated. The patient is told that occasionally there may be increased tenderness during the second to the fourth day and again shortly before the wart disappears.

The results of roentgen treatment in this group of 100 cases were as follows: cure, with complete disappearance of the wart in two months, in seventy-six cases; temporary cure with recurrence or formation of a new wart in from six to eighteen months after treatment in six cases. Cure of eighty-two patients agrees with the proportion of cures reported by other investigators.[3, 4] In twelve cases cure was not obtained, although in four of these the pain was relieved for a short time. In six cases the effect of treatment was questionable.

The number of treatments given to each patient is shown in Table 1. In most of the cases in which cure resulted only one treatment was given. The approximate dosage as measured in skin erythema doses may also be seen in Table 1. Most of the warts were given 1½ S.E.D. to 3 or 3½ S.E.D.

In the group in which cure was effected, relief from pain was noticed early.[5] A few patients reported a slight increase in tenderness in the period from the fourth to the fourteenth day. In these cases some of the tissue around the wart had probably been included in the field of treatment.

In the six cases in which results were questionable, two patients reported cure after four months. Although this may have been the result of roentgen therapy, the length of time between treatment and disappearance of the wart is too long to allow to be excluded other factors which may have had an effect on its disappearance. Another patient reported cure in four months, but the family physician had supplemented the roentgen therapy, and the additional measures may have been responsible for the cure. Another patient had the wart cauterized four weeks after receiving roentgen therapy, and cure followed. The question arises that, with such a short interval between roentgen therapy and cauterization, might not the wart have disappeared without cauterization? The sixth patient of this group reported cure three months after roentgen treatment, following application of a corn plaster. Warts are rather recalcitrant to this form of treatment, and it is probable that both types of treatment combined to effect a cure.

Evidently roentgen therapy is effective against plantar warts. It leaves no scar.[1] It is painless, and the earliest effect is relief of pain even before any organic change in the treated region can be seen.

The application is more effective if given in a single large dose, not less than 1½ nor more than 3½ S.E.D. of unfiltered radiation. It should not be repeated for two months. If a second treatment does not bring about cure, some other form of treatment should be employed, for some warts seem peculiarly resistant to radiation. Since a single dose, properly given, will cure approximately 80 per cent of the lesions, we feel that it is the method of choice and should have preference over all others.

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CASE REPORTS

NON-UNION OF THE FIBULA AT BIRTH*

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Waconia, Minnesota

There is little in the literature regarding congenital non-union of the fibula. A few cases have been reported and entire absence of the fibula has also been recorded. Probably 50 per cent of non-union cases finally come to amputation because of failure of bone grafts.

The patient, a boy fourteen months of age, was first seen on June 30, 1931. The parents were alarmed because the baby's foot would evert in attempting to walk.

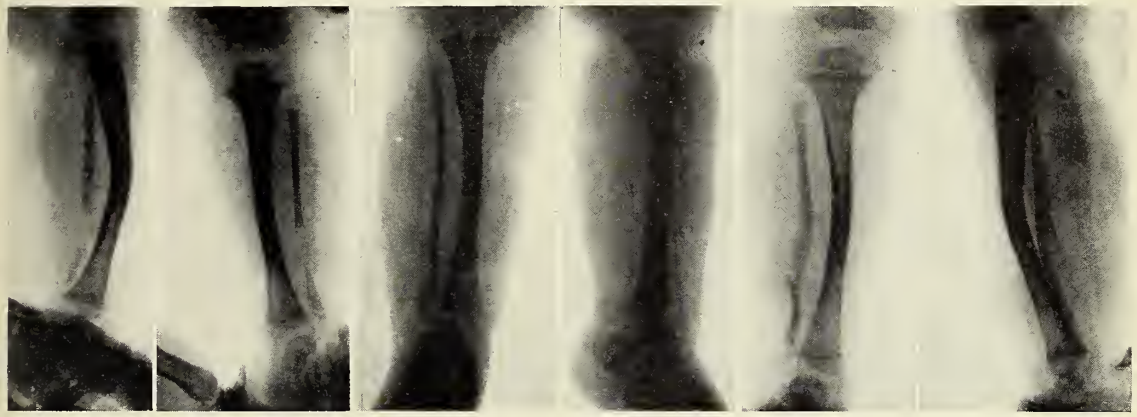
On examination there was some swelling and redness of the skin along the leg and in the region of the ankle joint. An x-ray film showed a non-union of the fibula in its lower third.

A cast which was changed at intervals was supplied for eight weeks with no result.

On January 7, 1932, the patient was brought to the Eitel Hospital in Minneapolis. Dr. C. A. Reed, who was called in consultation, agreed on the program of bone grafting.

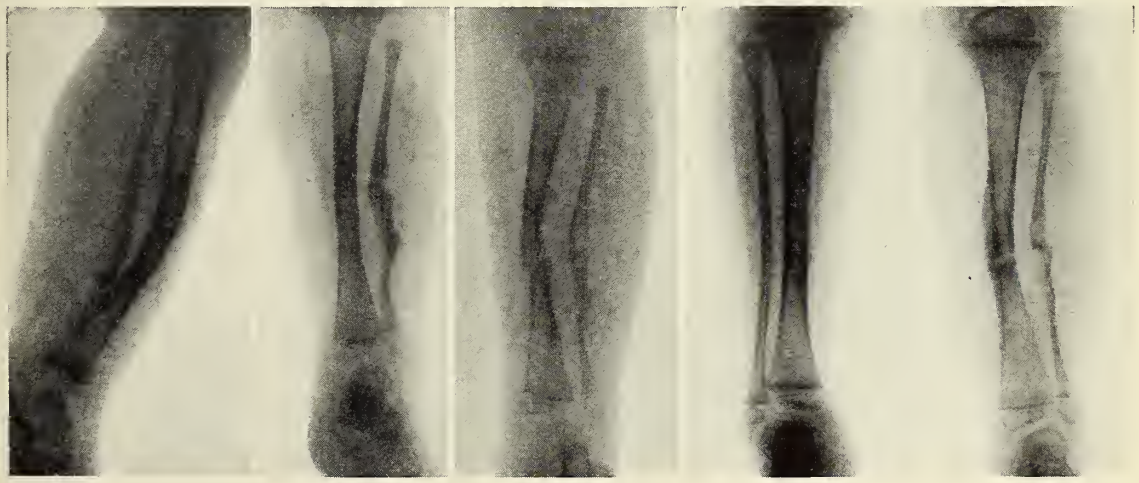
On January 8, 1932, a bone graft obtained from the tibia of the other leg was applied to the ununited fragments of the fibula. After fourteen days in the hospital the patient returned home with the leg in a cast. The cast was removed February 22, 1932, and a lateral splint applied.

The boy fell off the running board of his father's car on June 28, 1932, and an x-ray film showed a fracture of both the tibia and fibula in the middle third.



A *B* *C*

Fig. 1. *A*—X-ray taken July 24, 1931. Ununited fibula. Lateral and antero-posterior views. *B*—February 8, 1932. First graft. Antero-posterior and lateral views. *C*—April 14, 1932.



A *B* *C*

Fig. 2. *A*—X-ray taken June 28, 1932. Fracture through tibia and also fibula. Lateral and antero-posterior views. *B*—October 21, 1932. Non-union of fracture. Antero-posterior view. *C*—February 15, 1933. Graft has taken on both tibia and fibula.

*Read before the Eitel Hospital Staff meeting May 19, 1933.

Another cast was applied and continued with several re-applications until October 21, 1932. There being then no sign of union, on this date another bone graft was placed along the fractured tibia. The leg was kept in a cast until February 15, 1933, when x-ray showed union had taken place. The leg was kept in a cast another month and a moulded splint was substituted.

ECLAMPSIA WITH ABLATIO PLACENTÆ AND BLOOD PRESSURE OF ONLY 130

B. L. Gifford, M.D.
Hewitt, Minnesota

On July 12 the writer was called to take a case for a neighboring physician whose absence was necessitated by a death in his family.

The history as given by this family physician was that four previous pregnancies had resulted in spontaneous abortions at terms of from three to seven months. The preceding pregnancy resulted in a full-term, normal child. Repeated blood Wassermann reactions were all negative. The patient had received prenatal care from her regular physician during the preceding pregnancy and had had no evidence of kidney involvement. She, however, could not be persuaded to appear for prenatal care or urine examination during the present pregnancy.

The patient, thirty-two years of age, a gravida 6, para 1, was found to be seven months pregnant and in labor. She was in her home with a lay woman in attendance. She appeared lethargic from the hypodermic administration of a quarter grain of morphine given one hour previously by her regular physician in an effort to halt her premature labor. Intermittent labor pains had been present for past three hours at intervals of about fifteen minutes. General physical examination was essentially negative. Her temperature was 98.6, pulse 72 and regular. The blood pressure was 130 systolic, 72 diastolic recorded by a mercury manometer. The uterus was noted to have an abnormal tonicity, ligneous, but not the stone-like feel characteristic of large internal hemorrhage. This uterine tonicity rendered a diagnosis of fetal position impossible. The uterus was not larger than that of a seven months pregnancy.

Fetal heart tones were heard distinctly in the right lower quadrant, rate 140, and of good quality. There was no vaginal bleeding or discharge of any kind.

The patient had voided just prior to the writer's arrival but the attendant had discarded the specimen. Because of the apparent innocent appearance of the patient's condition a catheterized specimen was not obtained. The cervix was dilated two fingers breadth, and was fifty per cent effaced by rectal examination. Mild labor contractions at fifteen minute intervals roused the patient from her apparent morphine induced lethargy. Between times she dozed in restful slumbers.

Suddenly, without warning, she raised up in bed, complained of severe epigastric pain and stated she felt as though a tight band were being drawn about her body at the level of her diaphragm. Within a few minutes she went into a severe convulsion, followed by a deep coma lasting twenty minutes.

Arrangements were immediately made to transport the patient to a hospital, a distance of twenty-five miles. During this trip six convulsions ensued, lasting on an average of five minutes, with an interval coma of fifteen minutes.

On admission a catheterized specimen of urine boiled solid with albumin; no casts were found. The cervix was dilated five fingers. A spontaneous delivery took place within a few minutes, a contemplated version extraction being unnecessary.

The fetus was a still-born, face presentation, 35.2 centimeters in length. The placenta showed a large solid clot, adherent, and covering about one-third of the placental area. It reached to the margin of the placenta, but further bleeding had apparently been prevented by the membranes adherent to the uterine wall. Numerous areas of placental fibrosis were also present. The total blood loss, including the clot, was 250 c.c. The cord was approximately 60 centimeters in length.

The writer could hear no fetal heart tones after the first convulsion. A consultant, however, believed he heard the fetal heart just before delivery at a rate estimated to be 250. There was no vaginal bleeding before delivery. The blood pressure within eight hours postpartum mounted to 170 systolic and 120 diastolic. At no time before delivery did the systolic exceed 130 millimeters of mercury.

The patient had three postpartum convulsions within the next six hours. Under morphine and chloral hydrate therapy her convulsions ceased, and she experienced an uneventful recovery, the urine within four days showing only a trace of albumin with no casts.

Further questioning of the husband disclosed the fact that the patient had had no premonitory symptoms of eclampsia.

This case seems of interest for several reasons:

1. A blood pressure of 130 millimeters of mercury was found in immediate severe antepartum and intrapartium eclampsia.

2. Eclampsia and ablatio placentæ occurred together, allowing us to speculate as to the possible common cause.

3. In spite of low blood pressure and otherwise negative history and physical findings, a urine specimen should always be examined when a woman is seen for the first time in beginning labor.

CARCINOMA OF THE STOMACH WITH BILATERAL URETERAL METASTASIS*

Elmer C. Bartels, M.D.
Duluth, Minnesota

MACKENZIE and Ratner,[3] after reviewing the literature on metastatic growths in the ureter up to 1931, concluded that true metastatic growths in the ureters are relatively rare, as they found only eight authentic cases. To this number they added three cases of their own, one of which was a case of carcinoma of the stomach with metastasis to the right ureter. Their review included the recent reports of Rathbun[4] on carcinoma of the breast with metastasis to the left ureter and of Carson.[2] Cabot and Iber's[1] cases of malignant ureteral obstruction were limited to extension from the uterus and bladder with one case due to a large abdominal sarcoma.

As no cases of bilateral ureteral obstruction from metastasis from carcinoma of the stomach have been reported, it was deemed advisable to report this single case. Besides representing an interesting pathologic phenomenon the case is extremely important from the standpoint of diagnosis.

REPORT OF CASE

A white man, aged forty-seven years, first came to the Arrowhead Clinic June 1, 1933, complaining primarily of a dull pain in the lower part of the back of three months' duration and urinary frequency with terminal dysuria of three weeks' duration. His father had died at

*From the Arrowhead Clinic, Duluth, Minnesota.

seventy years of age of an unknown cause and his mother at forty years of age of heart trouble. Three brothers and one sister were living and well. He had been married seventeen years and had two children who were living and well. The patient's past history was negative except for pneumonia at the age of fourteen years with subsequent bladder trouble for a time and smallpox at the age of eight years.

The pain in the back, which started in March, was dull and intermittent and was not associated with motion. For the last month the pain had increased. It was constant and more marked on the left side. Urinary frequency was present, with diuria seven times and nocturia four to five times after 2 a. m. Dysuria, which was present at the completion of urination, was cramping in type and lasted one minute. The pain occurred with passing large as well as small amounts of urine, although the tendency was to pass small amounts.

In the last week before coming for consultation there had been slight swelling of the ankles during the day which went down at night. The patient also complained of undue tiredness. There had been no loss of weight.

Physical examination revealed a fairly well developed and nourished adult male who appeared quite ill. The blood pressure was 156 systolic and 100 diastolic measured in millimeters of mercury. Pulse and temperature were normal. Except for slight edema of the face and pallor of the skin and conjunctiva, the head and neck were normal. The glands in the neck and axilla were not palpable. Heart and lungs were normal to auscultation. The abdomen was slightly distended, especially in the epigastrium, but no masses or tenderness could be found. Genitalia showed no pathologic changes. Rectal examination revealed a firm, small nodular mass at the tip of the finger in the region of the left rectal shelf. The legs were moderately edematous. The reflexes were normal.

The laboratory findings showed erythrocytes numbering 3,000,000 and leukocytes 8,000 in each cubic centimeter of blood. The hemoglobin was 46 per cent (Dare). Urinalysis gave a slight reaction for albumin and 8 to 10 leukocytes per high power field on microscopic examination. The Wassermann reaction of the blood was negative. The blood urea was 81 mg. in each 100 c.c. of blood.

Because of the symptoms referable to the bladder and the mass on the rectal shelf, cystoscopic and proctoscopic examinations were done with negative results. There was no ulceration in the bladder or in the rectum at the level of the palpable mass.

As the pelvic symptoms were then thought to be metastatic in character, attention was focused on other organs in the search for the primary lesion. After a thorough grilling the patient admitted that in January he began to have slight bloating after meals which was associated with anorexia and constipation. This continued for one month, after which he began taking "Acidine"; complete relief followed. There has been nausea with vomiting in the afternoon at times during the last [illegible] which he attributed to the medicine that he had been taking for relief of the bladder distress and pain in the back. The vomitus was green, but did not contain food or blood. A little belching had also been noticed immediately after eating; no matter what he ate, even a glass of water would bring it on.

These symptoms justified a study of the stomach. Gastric analysis showed no free hydrochloric acid and 10 degrees of total acidity. Considerable bright red blood was aspirated. The roentgenogram of the stomach by Dr. Clement of St. Luke's Hospital showed a large filling defect in the cardiac end of the stomach, which he diagnosed as carcinoma.

The patient's general condition, the situation of the lesion and the presence of pelvic metastasis ruled out the possibility of accomplishing anything by surgical procedures. The edema and the high blood urea required explanation as the presence of carcinoma of the stomach could not be held responsible for them. My final opinion was that the metastatic lesions were in some way interfering with urinary output. The vesical pain was thought to be due to metastasis in the pelvis, and to pull on nerves with the emptying of the bladder.

The patient failed rapidly, with elevating blood urea, progressive edema of the body and ascites. The output of urine became suppressed and erythocytes were noticed in the urine on microscopic study. Uremic symptoms soon became manifest and the patient died June 22 of typical uremia with a blood urea of 113 mg.

At necropsy the essential findings were limited to the stomach, pelvis and urinary tract. In the cardiac end of the stomach, on the posterior wall, was a large infiltrating fungoid carcinoma which measured 6 by 8 cm. This mass had extended posteriorly into the retroperitoneal space and laterally into the hilar region of the spleen. In the pelvis in the rectovesical space were small infiltrating peritoneal masses about 1 by 0.5 cm. One slightly larger mass made of a number of smaller lesions represented the mass which was felt on rectal examination. The peritoneum of the intestines was not involved. The bladder was distended with 700 c.c. of urine but appeared normal. There was bilateral hydronephrosis with hydro-ureters, graded 3 on the left and graded 2 in the right on a basis of 1 to 4. The left ureter was almost completely obstructed at a point 4 cm. from its entrance into the bladder by an infiltrating tumor which had extended from the peritoneum into the wall of the ureter. This mass was about the size of a bean. The right ureter was similarly obstructed by an infiltrating nodule of the same size at a point 3.5 cm. from its entrance into the bladder. The prostate gland appeared normal and no metastatic nodules were found in any of the other viscera.

SUMMARY

A case of carcinoma of the stomach has been reported in which death was caused by renal insufficiency. Death due to renal insufficiency is seen not infrequently in carcinoma of the cervix and carcinoma of the bladder, but is an unusual type of death in carcinoma of the stomach. As such symptoms are rare in carcinoma of the stomach, diagnosis was difficult to make. The ureteral obstruction was due to metastasis by the drop method which had infiltrated the peritoneum and subsequently the ureters.

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President's Letter

Federal Emergency Medical Relief

THERE is now in the hands of the State Board of Control a considerable amount of Federal money which may be used to supplement state and other funds, for the care of the indigent people of Minnesota.

Under the provisions of the act providing these funds, this money may be used to pay for medical services and for medical supplies.

These funds are available at present in twenty-nine counties, mostly in the northern part of the state, with more counties being added to the list almost weekly.

A committee of the State Medical Society is working in close cooperation with the State Board of Control, in the process of developing a uniform plan for the medical care of the indigent and the payment of physicians for such services. We hope to have it under way by the early part of September.

Yours very truly,



President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

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Vol. XVI September, 1933 No. 9

N.R.A. AND THE PHYSICIAN

The subject most before the public today is the National Recovery Act. Admittedly in the nature of an experiment, it is already resulting in more employment, more overhead, and it is expected will result in more purchasing power and eventually better prices and better times. The establishment of an equal competitive basis and the elimination of child labor and ridiculously low wages are to be heartily recommended. The universal backing of the N.R.A. by public opinion is absolutely necessary for the success of the movement, and there is some indication that if public opinion is not sufficient, government coercion may be necessary and will actually be employed.

Physicians, though not themselves directly affected, can lend hearty support to the N.R.A. Most physicans are on call day and night, and the demands for professional service cannot be limited to specified hours. Professional employees of physicians, such as laboratory technicians, radiographers, anesthetists and similar groups are likewise not affected. It should not be necessary to adopt a special code in addition to the blanket code for other employees of physicians.

The code for the hospitals has not as yet been definitely established. Employees concerned directly in the care of patients are apparently not to be included under the provisions of the blanket code. Hospital employees on a lower wage level will probably be included, although this will work a hardship on the already hard pressed hospitals.

The medical profession has never been lacking in patriotism and can be counted on to do its part in support of the President in his efforts to break the vicious circle so tragically evident the past few years.

HOSPITAL INSURANCE

One of the known facts which was further emphasized by the report of the Committee on the Costs of Medical Care was that hospital care is expensive and its cost is not evenly distributed. Insurance to cover such cost is theoretically the answer.

The one criticism to all insurance is the high overhead which seems to accompany most types of insurance. For instance, it costs most of the large life insurance companies about as much to furnish insurance as is paid out in benefits. In the case of life insurance there is little chance for quibbling. When a man is dead, he is dead. Life insurance companies have operated long enough to provide accurate statistics and rates can be accurately determined. Not so with accident and health insurance. A man may think he is sick or think he is disabled from an accident and attempt to collect from his insurance, whereas he would be able to carry on if he had no insurance coverage. This uncertainty and difference of opinion which frequently leads to legal suits have made sickness and casualty insurance anything but profitable for companies which have entered this field.

Hospital insurance is in its infancy. There is little experience upon which rates can be established. It has much of the uncertainty of health

and accident insurance. The issuance of individual policies at random is too likely to include a high percentage of those suffering from chronic ailments. For these reasons the larger insurance companies have not entered the field. A recent questionnaire was sent to some of the representative insurance companies requesting their attitudes to hospital insurance.* None of them was interested.

The Trustees of the American Hospital Association, however, have given their endorsement to the idea of hospital insurance and referred the subject to the Council on Community Relations and Administrative Practice for study and recommendations. This approval is modified by certain limitations and recommendations of the Council mentioned.

Group hospital plans differ considerably. The National Hospital Association certainly should take an active part in directing the movement. A group hospital insurance plan which includes all the hospitals in a community is quite different from one instituted by a single hospital in the city. The medical profession has rightly opposed the adoption of the plan by the individual hospital, which is bound to affect the relation of the patient to his physician.

The plan proposed by the hospitals in Saint Paul aroused some discussion in medical circles and received some mention in our columns. The organization is in operation but has shown a slow growth, doubtless due in large part to the fact that nobody has money for anything. It is thought that by keeping the overhead down to a minimum, avoiding the high overhead incident to most insurance, and limiting the policies to groups of wage earners, the rate of nine dollars a year will be sufficient.

The profession will watch with considerable interest the progress of hospital insurance, which is more or less in the nature of an experiment. Any measure which will relieve the unequal distribution of the cost of illness should receive the support of the profession as well as the public.

PIONEER MUTUAL HEALTH AND BENEFIT INSURANCE COMPANY

Medical, surgical and dental service for $1.50 a month. This amount per individual to pay the doctor and dentist, the overhead of the health service or insurance and provide presumably satisfactory service. What individual would not gladly pay this small amount each month if he thought he could thus satisfactorily care for his doctor's and dentist's fees. Satisfactory medical service cannot be supplied for the fraction of this amount which would be the doctor's share.

But this was not the reason why the charter of the Pioneer Mutual Health and Benefit Insurance Company was declared forfeited by the District Court of Ramsey County. Here was another instance of a corporation proposing to practice medicine. A corporation is not an individual, but is a creation by the legislature and thus according to law is not a natural individual and cannot practice in the State of Minnesota. Physicians and dentists were to have been hired at low salaries and one can readily imagine that the insured would have obtained just about the service paid for. The proposition is just another example of an attempt to take advantage of the times and commercialize the medical and dental profession on a ridiculously low financial basis. The outcome of the suit which was conducted by the Attorney General with the assistance of Mr. F. Manley Brist, will be to the benefit of the public, the medical and dental professions and, we believe, of the corporation itself.

OF GENERAL INTEREST

Dr. Ramby Rasmussen has opened offices at 1147 Medical Arts Building, Minneapolis, for the practice of orthopedic surgery.

Dr. A. E. Booth of Minneapolis left Sunday, July 30, for New York where he sailed on board the steamship Washington for Europe. Dr. Booth was a delegate to a medical conference in Berne, Switzerland, August 10. He will be away six weeks and will also visit in Austria and Germany.

Attention should be called to an announcement which was inadvertantly published in the General Interest column of our July number. The announcement referred to a newly formed organization to be known as the Ramsey County Surgical Society. This organization has no connection with the Ramsey County Medical Society, the officers of the surgical society as published in the July number not even being members of the county medical society.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

MEDICINE PEDDLER ARRESTED AT NEW ULM, MINNESOTA

State of Minnesota vs. John Stramer

On July 24, 1933, John Stramer was arrested at New Ulm, on a charge of peddling without a license. He is an itinerant vendor of a preparation called Trunox, which preparation is being recommended for the treatment of arthritis, liver, kidney and stomach trouble. Stramer entered a plea of guilty before a justice of the peace and was fined $60.00 and costs. Upon the payment of the fine and costs he was ordered to leave the State of Minnesota. The investigation made discloses that this man is driving a 1928 Chrysler with a Washington State license. He is accompanied by his wife and two children, both girls, five and nine years of

*Hendricks, T. A.: What Some Big Insurance Companies Think of Group Hospital Insurance. Jour. Indiana State Med. Assn., August, 1933.

age. Stramer, according to his own admission. has been charging up to $200 for treating arthritis. He claims to have come to Minnesota from Pasco, Washington. He admits having treated patients in the neighborhood of Sauk Center, Becker and Dayton, Minn. If Stramer is seen anywhere in the State of Minnesota, please notify the State Board of Medical Examiners at 524 Lowry Medical Arts Bldg., Saint Paul, Minn. Stramer's correct name is Gerhard John Stramer, but he goes by the name of Jack.

JUDGMENT ENTERED AGAINST MEDICAL CORPORATION

State of Minnesota ex rel. Harry H. Peterson, Attorney General, *vs.* Pioneer Mutual Health and Benefit Insurance Company of Minnesota, a Corporation

On July 29, 1933, judgment was entered in the District Court of Ramsey County against the Pioneer Mutual Health and Benefit Insurance Company, as follows:

> "It Is Hereby Adjudged and Decreed that the charter, liberties, privileges and franchise of said corporation, be and the same hereby are forfeited to the State of Minnesota, and the existence of said corporation is hereby annulled."

This corporation was organizd by lay people early in 1933, for the purpose of "maintaining a health service or insurance." Medical, surgical and dental services were to be supplied to policy holders for $1.50 per month. Quo warranto proceedings were instituted by Attorney General Harry H. Peterson to dissolve the charter of this corporation. The Court, Judge Boerner presiding, held the acts to be unlawful, but a stay of forty days was granted to permit the defendant corporation to appeal to the Supreme Court of Minnesota. The time for taking the appeal having expired and no appeal being taken, judgment was accordingly entered, and a certified copy of that judgment has been served upon Mike Holm, Secretary of State, terminating the existence of this corporation.

OBITUARY

Dr. Edward H. Whitcomb

Dr. Edward H. Whitcomb, one of Saint Paul's oldest physicians, died in St. Joseph's Hospital on June 8, 1933, after an illness of two months. He was seventy-two years old and had practiced in Saint Paul continuously for forty-nine years.

Dr. Whitcomb was born on July 18, 1861, in the township of Greenleaf, in Mecker County. His father was Captain George Whitcomb, and Edward's early years were filled with U. S. Army Post life and Indians. He received his early schooling at Alexandria, Minnesota. He attended Carleton College for a time, then came to St. Paul, where he worked and studied with Dr. James H. Murphy for about a year before going to Medical College at Columbus, Ohio. He was graduated from that school in 1884 with the highest honors.

The doctor located immediately in St. Paul, where he practiced to the time of his death. He practiced general medicine and surgery, but his main interest was industrial work.

Dr. Whitcomb was a staunch Democrat and served twice as Ramsey County Coroner and once as City Assemblyman. He was a Major on Governor Johnson's staff and was Assistant Surgeon General of Minnesota. He was a past potentate of the Osman Temple Shrine, past exalted ruler of the St. Paul Elks, and a member of the Maccabees, Knights of Pythias, Samaritans, Druids, Woodmen, and of the St. Paul Athletic Club.

He was a member of the Ramsey County, the Minnesota State, the American Medical Association, and of the Mississippi Valley Medical Association.

In the passing of Dr. Whitcomb goes one who was intensely interested in his host of friends, in their health, happiness, and prosperity. He never failed to offer his every assistance in time of need and his many friends will ever feel their tremendous loss. We wish to offer our deepest sympathy to his family.

Dr. Whitcomb is survived by his wife, Georgiana Whitcomb; his daughter, Elsie Whitcomb; a sister, Mary Elisabeth Whitcomb; a brother, George F. Whitcomb; and two nephews, Carlos F. Whitcomb of Minneapolis, and Dr. H. W. Whitcomb, Grand Forks, North Dakota.

Dr. Adolph Stierle

Dr. Adolph Stierle died Tuesday, August 8, 1933, at his home in Saint Paul after a long illness. He received his M.D. degree from the University of Minnesota in 1901, was made medical examiner for the Great Northern Railway, which position he held for many years, and later became president of the American Benefit Association. He was a member of the Ramsey County Medical Society and of the Minnesota Pharmaceutical Association.

He is survived by a sister, Mrs. Therese Finnell, with whom he lived.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of September will be as follows:

September 6—The Heart in Goiter.
September 13—Treatment of Diabetes.
September 20—Height, Weight and Health.
September 27—Patient and Doctor.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

The annual session of the Northern Minnesota Medical Association will be held September 8, 9 and 10, 1933, at Willmar, Minnesota. Meetings will be held at the Elks' Club and in the auditorium of the State Asylum with headquarters at the Lakeland Hotel.

The officers of the Association are: Dr. B. J. Branton, Willmar, president; Dr. Owen Parker, Ely, vice president; Dr. O. O. Larsen, Detroit Lakes, secretary-treasurer.

Following is the program scheduled to begin at 9 A. M., Friday, September 8:

1. "Pre-Cancer Pathology"—Wm. A. O'Brien, M.D., U. of Minn., Minneapolis.
2. "The Tuberculous Child"—J. A. Meyers, M.D., Minneapolis.
3. "Newer Laboratory Technic"—C. R. Drake, M.D., Minneapolis.
4. "The Heart in Adolescence and Old Age"—C. N. Hensel, M.D., Saint Paul.
5. "Arthritis"—MacNider Wetherby, M.D., Minneapolis.

SURGICAL MEETING—2 P. M.

1. "Do's and Don'ts in Fractures"—R. C. Webb, M.D., Minneapolis.
2. "Acute Conditions of the Gall Bladder"—J. M. Hayes, M.D., Minneapolis.
3. "The Surgical Treatment of Pulmonary Tuberculosis"—T. J. Kinsella, M.D., Oak Terrace.
4. "Common Eye Injuries"—Erling W. Hansen, M.D., Minneapolis.
5. "Bladder Surgery"—Virgil S. Counseller, M.D., Rochester.

The banquet Friday evening will be presided over by Dr. W. A. O'Brien. Short speeches will be presented by Drs. B. J. Branton, N. O. Pearce, F. J. Savage, H. H. Jensen and an address will be given by Dr. John W. Powell of the University of Minnesota on "The Uses of Poetry."

The meeting will be continued Saturday, September 9, at 9 A. M. with the following addresses:

1. "Eclampsia, Prevention and Treatment"—George Hudson, M.D., Saint Paul.
2. "Obstetrical Analgesics"—Samuel B. Solhaug, M.D., Minneapolis.
3. "Complications of the Second Stage"—Jalmar H. Simons, M.D., Minneapolis.
4. "The Development of Tuberculosis in the Human Lungs"—C. A. Stewart, M.D., Minneapolis.
5. Film—"The Mental and Nervous Child"—N. O. Pearce, M.D., Minneapolis.
6. "Medical Economics—E. A. Meyerding, M.D., Saint Paul, and Herman W. Johnson, M.D., Dawson.

At 2 P. M. the following program will be given in the auditorium of the State Asylum:

"Headaches"—W. H. Hengstler, M.D., Saint Paul.

Mental and Nervous Clinic—W. H. Hengstler, M.D., Saint Paul; Joel C. Hultkrans, M.D., Saint Paul; Hewitt B. Hannah, M.D., Minneapolis, and L. R. Gowan, M.D., Duluth.

A golf tournament will be held on the Willmar Golf Course following the meeting Saturday and on Sunday, September 10. Entries should be sent in advance to Dr. R. J. Hodapp, Willmar, Minnesota.

MEDICAL ALUMNI ASSOCIATION

The annual clinical meeting of the Minnesota Medical Alumni Association will be held Friday, October 27, 1933, at the University Hospital in Minneapolis. This meeting will be the day before Minnesota's Homecoming game with Iowa. There will be a luncheon at the University Hospital for those attending the meeting. All persons interested in attending the meeting will be welcome.

BOOK REVIEWS

FETAL, NEWBORN AND MATERNAL MORBIDITY AND MORTALITY. A publication of the White House Conference. 486 pages. Illus. Price, cloth, $3.00. New York: D. Appleton-Century Company, 1933.

THE HISTORY AND EPIDEMIOLOGY OF SYPHILIS. Wm. Allen Pusey, A.M., M.D., LL.D. Professor of Dermatology Emeritus, University of Illinois, etc. 113 pages. Illus. Price, cloth, $3.00. Springfield, Illinois: Charles C. Thomas, 1933.

SURGICAL ERRORS AND SAFEGUARDS. Max Thorek. 696 pages. Illus. Price $10.00. Philadelphia: J. B. Lippincott, 1932.

This work is written in a most interesting manner. It covers the field of general surgery in a style which keeps the reader constantly interested. As the title implies, the author goes over many mistakes made in judgment of the patient and in technic. He illustrates these from his own experience, not being content to relate alone the sad tragedies of others.

As an illustration of his style I would quote the following under Anesthetics: "The safety and comfort of the patient must never be subordinated to brilliancy or novelty of operating." He describes thoroughly the many methods of approach in the various operative procedures and outlines safeguards which should be taken. He illustrates his points with case reports, and shows all through the book anatomical plates and anatomical descriptions which are enlightening and will be of great assistance to both student and practitioner.

WALTER D. BRODIE, M.D.

CASE STUDIES IN THE PSYCHOPATHOLOGY OF CRIME. Ben Karpman, M.D., Psychotherapist, St. Elizabeth's Hospital, Washington, D. C.; Professor of Psychiatry, School of Medicine, Howard University, Washington, D. C. Leather. Price, $12.00. Pp. 1042, with 2 graphs and 12 maps. Washington, D. C.: Mimeoform Press, 1933.

Sometimes it is said that psychiatrists have a tendency to much verbiage. Well, the Case Studies in the Psychopathology of Crime ought to serve as an illustration, for here we have 1,008 pages of printed matter devoted to reports of five cases! But, if the statement in the Preface, "Of all social problems it [crime] is undoubtedly the most pressing; of all influences, the most demoralizing; no economic expression of its cost, however high, can ever depict its profound and far-reaching effect on the community," is correct, then, elaborate detail would seem to be justified. Each case study comprises, first of all, an official record; then, the case study proper, followed by anamneses and observations, patients' letters, follow-up, diagnoses, discussions, interpretations and epitome. It is suggested that criminals are made, rather than born, and, for that reason, much work is devoted to the process of "making."

The first case is reported as an illustration in which the whole reaction appears as an overcompensation for a deep sense of defeat. The second case is one of constitutional psychopathy. The third illustrates the case of a homosexual male prostitute. The fourth represents a personality with hysterical make-up, allowing emotional entanglements which lead the patient to criminal activity. The fifth case illustrates the development of criminality as an emotionally conditioned reaction, which at the proper time could have been corrected.

While the book may appeal to a limited group of students, its sale is restricted to members of the medical, legal, scientific and other professions having a direct and definite interest in medical and social problems. Undoubtedly, it will serve well those who are particularly interested.

JOSEPH C. MICHAEL, M.D.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

A British M.P. Looks at the Panel System

From M. S. Henderson of Rochester, former president of the State Society, who is much interested in the results of health insurance systems in European countries, came the clipping from the London *Times* of Sunday, July 30, quoted below.

The clipping is an interview with Mr. F. A. Macquisten, Member of Parliament for Argyle, who attacked the panel system in the *Times* at the time of a general national celebration of the 22nd anniversary of the passage of the National Insurance Act.

Mr. Macquisten may be no more than a politician who now sees the wind blowing away from socialistic experiments and wishes to trim his sail. Or he may be as observant and shrewd as he sounds. In any case, the interview shows that the panel system does not go unchallenged in high places. Dr. Henderson observed in his note from London that it is typical of a good many like utterances. He believes, however, that the act is now pretty firmly entrenched.

"The panel system is the breeding-ground of the commercial-minded doctor and if the medical profession is going to regain its former standing, the panel system should be destroyed root and branch," says Mr. Macquisten, in the *Times* interview.

"I have been amazed that in all the ballyhoo in celebration of the National Insurance Act, only one or two people have told the truth about the panel system.

"It has been claimed that the panel is a justified system and that the doctors are much better off than before. So would be any section of the community quartered upon the rest by Act of Parliament.

"The mass of the legal profession would welcome an Act of Parliament permitting them to collect a thousand or two of their fellow citizens into a panel and empowering them to levy an annual tax for legal advice whenever the panel clients desired it.

"It would be a comfortable dole, enabling them to subsist while they built up a remunerative practice among fee-paying clients and a refuge from want if they failed to do so.

"The compulsory nature of the National Health Insurance Act deprives it of any right to the description of insurance which is a voluntary act. No one under compulsion feels he owes any duty to the scheme, but to try to get his or her money back.

"Married women have been pillaging the funds and had their benefits reduced. Many of the doctors do not wish to lose their tax payers and so certify on the slightest excuse.

"The panel system is detested by many of the more respectable and thoughtful working men, of whom a very considerable number decline to nominate a panel doctor, let alone consult him as such.

"The commercially minded doctor is an abomination and is usually of mediocre professional skill.

"I challenge the champions of the panel system, Mr. Lloyd George, the Ministry of Health and all the panel doctors to put their claims to the test by abolishing all compulsory contributions. We would then soon discover the baselessness of the claim that the system is popular with the people."

Mr. Macquisten is said by the *Times* to be noted equally at Westminster for his "humor and the vigor of his criticism."

Minnesota State Medical Association

Eightieth Annual Meeting

Rochester, Minnesota

PROCEEDINGS OF THE HOUSE OF DELEGATES

First Meeting—Sunday Evening, May 21, 1933

The opening session of the House of Delegates, held in connection with the Eightieth Annual Session of the Minnesota State Medical Association, at the Kahler Hotel, Rochester, convened at seven twenty-five o'clock, President N. O. Pearce presiding.

PRESIDENT PEARCE: The meeting will now come to order.

The first business will be the appointment of the Committee of Credentials. I have already appointed that committee as follows: C. A. McKinlay, Minneapolis; A. B. Stewart, Owatonna; M. W. Smith, Red Wing.

Is the Committee on Credentials ready to report?

DR. C. A. MCKINLAY: We have credentials of thirty and two others that are certified. If there are any others we would like to get them.

PRESIDENT PEARCE: There being a quorum of delegates present, the meeting will now become officially opened.

The next order of business is the greeting of guests. Are there any out-of-town or out-of-the-state guests in the meeting? (None)

The next order of business is the acceptance of the minutes of the last session as transcribed by the official reporter and published in full in the September and October, 1932, issues of MINNESOTA MEDICINE. A motion will be in order to accept the minutes as published in MINNESOTA MEDICINE last September and October.

DR. C. L. SCOFIELD (Benson): I move they be accepted.

DR. H. M. WORKMAN (Tracy): I second the motion.

PRESIDENT PEARCE: It has been moved and seconded that the minutes of the previous meeting of the House of Delegates be accepted. All in favor of the motion will signify by saying "aye"; contrary "no." The motion is carried.

Dr. Earl, who is chairman of the Committee on Public Health Education, is obliged to leave because of an urgent call. We are going to set aside the order of business and let Dr. Earl speak on his report.

COMMITTEE ON PUBLIC HEALTH EDUCATION

Chairmanship of the Public Health Education Committee passed in January, 1933, from the hands of L. R. Critchfield to those of George Earl, former chairman. The work of the committee proceeded steadily, several undertakings of note marking the last period under Dr. Critchfield's direction (May, 1932, to January, 1933). A new series of small group meetings among the membership is in process of arrangement now (see below), as the most recent project of the committee looking to better organization and more intelligent joint action among physicians.

4-H CLUB EXAMINATION

Among the events of the last part of last year was the second annual physical examination of 4-H Club candidates for healthiest boy and girl of the state. The examination was held at State Society headquarters, 11 W. Summit Avenue, Saint Paul, September 8, with the aid and coöperation of the Minnesota Public Health Association. Credit attaches to the examiners who selected the winner from the hundred well-groomed specimens who presented themselves for judging at the State Society headquarters. These examiners earned for medicine and for the medical profession of the state the good will of the 4-H Club groups as well as each of the 100 farm boys and girls who competed.

This examination has been under contemplation for many years. It was desired by the 4-H Club advisers at the University Farm, and was brought about last year for the first time, when satisfactory arrangements for the place of examination, for assistance, and for working conditions were arranged through the offices of the Minnesota Public Health Association.

FIRST AID MANUAL

Coöperation with the Minnesota Public Health Association in the publication and distribution of the First Aid Manual to all of the schools of Minnesota early in October was a departure of the year. This manual was published in response to the need for an authentic guide to the teacher both in time of emergency and in the regular teaching of hygiene. Its text was carefully prepared to give only such instructions as should properly be carried out in anticipation of the doctor's arrival. Its constantly repeated instruction was "Call the Doctor First!" The Manual was also offered to every physician in the state for distribution in any institution in which he might have an interest.

In this way we hope to counteract the propaganda of commercial agencies who constantly distribute literature urging the use of proprietary antiseptics in every emergency.

This is in conformity with the policy followed by this committee ever since its inauguration, of keeping the medical profession before the public as the only reliable agency by which life and health can be protected.

FOR TEACHERS

The Public Health Education Committee, with the cooperation of the Minnesota Public Health Association, again brought Dr. Morris Fishbein to Saint Paul during this period, to speak before the Minnesota Education Association. He spoke to the assembled 9,000 teachers four times during his stay in Saint Paul, the final appearance being the headlined address on "Frontiers of Medicine" at the largest evening meeting of the convention.

In addition to the foregoing special activities the regular routine work of the committee continued for the year as usual.

NEWSPAPER SERVICE

The newspaper service is sent weekly to 340 newspapers in the state. The Editorial Sub-committee of which Dr. H. F. Helmholz of Rochester is chairman censors and revises each bulletin bearing our endorsement. These bulletins continue to be prepared and sent out from the state office, with the aid of facilities made available by our alliance with the Minnesota Public Health Association.

The news service for 1932 cost $1,430.75. This we believe to be money well spent.

A few years ago an urgent demand was made upon your state association to counteract in some way the

great amount of undesirable health publicity that was published in the papers of our state, especially the smaller rural weeklies. In compliance with this demand, a news service was instituted, which at first served less than 100 papers, and now serves about 340 papers out of a total of 494 in the state.

Most of the papers in the state, including those in the Twin Cities, are using these stories.

The remaining number of papers obtain their health news from the McFadden news service, cultists and similar sources.

The objective of this service has been to bring to the public the truth about health as endorsed by the Minnesota State Medical Association. Great Credit is due to Dr. H. F. Helmholz, chairman of the Sub-committee, and his assistants, and to the secretary, Dr. E. A. Meyerding, and to Mrs. Florence Fitzgerald.

MEETINGS

Public health meetings, county society meetings, conferences, Public Health Nurses' meetings, Parent-Teachers' Association meetings, luncheon clubs, have been addressed in behalf of better public understanding of the problems of the medical profession and of scientific medicine in different parts of the state. Travelling expenses for these trips were paid by this committee.

SPEAKERS' LIBRARY MATERIAL

Members with public health talks to give make frequent demands upon the Speakers' Library maintained at the State Office. This library is kept useful and up-to-date by the continuous additions from current periodicals, government bulletins, new publications of all sorts. It is available to members at any time. Packets of material may be had by mail to any part of the state.

TUBERCULIN TESTING

The Committee continues to endorse and foster the program of tuberculin testing carried on in many parts of the state, this year as well as last, by the Minnesota Public Health Association. We regard this program as of the utmost importance, not only to tuberculosis control, but to enlightened medical practice since it brings to the doctor's office for repeated physical examinations many children in need who are otherwise unaware of their need of medical attention.

LEGISLATURE—HYGEIA AND EVERYBODY'S HEALTH

Everybody's Health was sent to members of the legislature as in former years during 1932-33. We have not renewed our subscriptions to *Hygeia* for legislators this year.

CONTACT WITH CHRISTMAS SEAL ORGANIZATION

We wish to reiterate that the alliance between our committee and the Christmas Seal organization, the Minnesota Public Health Association and its affiliated county public health associations, continues to be one of our strongest and most worth while, and at the same time most economical, contacts.

MASS X-RAY

A concrete problem that is likely to present itself to us soon is involved in the possibility of mass x-raying in lay hands or in the hands of persons not directly under the supervision of scientific medicine. A machine that will take mass x-ray pictures at nominal costs is now thought to be close to perfection. Such a machine in commercial and cultist hands, might well cause much harm, whereas, under control of scientific medicine, it could be used legitimately to assist in a high type of diagnostic procedure at proper times and places.

The principle involved in foreseeing such situations and in forestalling them by prompt action is the same as has prompted us in the past to take a stand against lay use of sun lamps for indiscriminate treatment. It may also be seen in the retention in our own hands of the work of the Heart Association which would otherwise have passed into lay hands, ill-equipped for such work. This committee urges study and alert action to prevent irresponsible and indiscriminate promotion by untrained persons of useful apparatus such as the new x-ray machine and of strictly medical programs such as organized propaganda for the lowering of deaths from heart disease.

SMALL GROUP MEETINGS

The Committee on Public Health Education is desirous during the remaining months, of instituting a series of discussion meetings among small groups such as hospital staffs, or others smaller than the regular organized county medical society groups.

The following basic principles underlying medical organization might be discussed at these meetings with the object of formulating a definite attitude on the mission and scope of medical organization, and also of eliciting opinion on the current aims and methods of our organization in Minnesota.

DISCUSSION PRINCIPLES

1. Members of organized medicine form a true guild. (*Note:* Dean Scammon's talks which have already reached a large part of the profession make the use of this term increasingly understood. Those who have not heard Dean Scammon, may read his talk in MINNESOTA MEDICINE for March, 1933.)
2. Scientific medicine must be the basis of all our activities now and in the future.
3. The medical profession alone is qualified for leadership in public health work as well as in private medical practice.
4. Continuous changes in our social and economic organization previous to the depression are emphasized and rendered critical for us by the present financial stringency. They require our careful study.
   a. State medicine was making rapid progress before the crash of 1929. It took the form of large appropriations of public money for city, county, state and government hospitals and for the establishment of government health agencies. Since the depression these hospitals have been over-crowded and the agencies hard-pressed by the volume of work.
   b. Better organization within the medical profession, itself, continues to make the scientific services such as x-ray, laboratories, etc., more easily available and cheaper and will, eventually, without social upheaval, achieve an equitable and proper public distribution of services.
5. Strong medical organization is necessary within which the medical man who must assume leadership in all matters of health, may study his problems, formulate his plans, and eventually put them into effect.
6. Constructive criticism on the part of all of our members is essential to continuing advancement.
7. Every member of the guild has the same responsibilities toward the social and economic developments in his profession as he has to its scientific advancement.

FOR A UNITED FRONT

The above is only a brief suggestion of what might be discussed at these small group meetings. In the past such meetings have developed occasionally into hearings of grievances. But the result has nearly always been the promotion of friendship and understanding and a spirit of solidarity.

It has been found in the past (many such meetings were held by members of the committee during the period of organization of the state society on its present basis) that while a first meeting may result in pro-

nounced differences of opinion, a second meeting of the same group has found the members with an altered attitude and ready for more serious study of the problems confronting us. In any case, no matter what the outcome, the final opinions expressed at these meetings should represent pretty well the thinking of our entire guild and so enable us rightly to guide our policy and program.

We are urging our members to begin at once with a trial of one or more of these small meetings because we feel that never was there a time when medicine more actually needed to present a united front, and never, at the same time, has there been such a decided interest on the part of all medical men in the economic and social problems of medical practice.

FINANCIAL REPORT

Analysis Public Health Education Committee

(12 Months Ending Dec. 31, 1932)

News Service	$1,430.75
Legislature—Hygeia and Everybody's Health	307.00
Stenographer	660.00
Radio	487.23
Miscellaneous Postage and Printed Matter	99.67
Speakers	431.02
Sundries, Petty Cash, Telephone and Telegrams	17.20
4-H Club Examination	85.70
First Aid Manuals	375.00
Posters sent out at 1½c each	60.00
TOTAL	$3,953.57

COMMITTEE ON PUBLIC HEALTH EDUCATION

H. B. Bailey, M.D.	Fairmont
H. R. Baker, M.D.	Hayfield
R. O. Beard, M.D.	Minneapolis
Peter Boysen, M.D.	Pelican Rapids
B. J. Branton, M.D.	Willmar
H. C. Cooney, M.D.	Princeton
C. O. Estrem, M.D.	Fergus Falls
B. J. Gallagher, M.D.	Waseca
E. K. Green, M.D.	Minneapolis
H. F. Helmholz, M.D.	Rochester
F. J. Hirschboeck, M.D.	Duluth
B. R. Karn, M.D.	Ortonville
F. H. Magney, M.D.	Duluth
J. A. Myers, MD.	Minneapolis
F. H. Neher, M.D.	Saint Paul
C. J. Plonske, M.D.	Faribault
J. S. Reynolds, M.D.	Minneapolis
B. B. Souster, M.D.	Saint Paul
T. H. Sweetser, M.D.	Minneapolis
L. R. Critchfield, M.D.	Saint Paul
George Earl, M.D.	Saint Paul

DR. GEORGE EARL: Yesterday afternoon I met Mr. Brist in front of the Lowry Building, and with him was the assistant attorney-general. We started to talk about our famous Saint Paul case, the Pioneer Insurance case, which all of you know about. For those of you who don't know about it, I would state that the Pioneer Insurance Company is a lay group that is trying to commercialize medicine, men who are not doctors forming a corporation and employing doctors.

Mr. Brist told me that a good many of the Saint Paul men had been down listening to the trial and giving it support by their presence. He said that the matter is now in the hands of the judge for decision. Among other things, Mr. Brist told me that he is officially and legally in the employ of the Board of Medical Examiners, but he made this remark, that it was a chairman of one of our State Medical Association committees who got to the attorney-general and arranged for the support of the attorney-general's office in the conduct of the case. In other words, it was Dr. Johnson of the Legislative Committee who had the foresight to reach the attorney-general and to do the work. I simply want to point out how indirectly the State Medical Association is behind so many things for which it doesn't get official recognition or credit.

The State Board of Medical Examiners is a very creditable Board. We know the members on it. We know they are faithful. They are doing a splendid task. But who put them there? It was you people, the members of the Minnesota State Medical Association, through an organization, after you had secured a full-time secretary, and working through the excellent line of presidents and councilmen and chairmen of committees, and officers that you have had, and everyone in his own county society that made possible the passage of a law that created the State Medical Board of Examiners, that made it possible to secure Mr. Brist and the attorney general's office to block what has happened in California. There is need for constant watchfulness.

On Friday it was very strange that three successive things should happen. Mr. Gray, I think, of the United States Public Health Service in Minneapolis, called up and was quite aroused over the talks coming over WRHM at eleven-five by Mr. Soule, who is urging that the osteopaths and chiropractors be given a share on the hospital staffs. Mr. Soule also has the courage to ask for contributions from the radio listeners to help him aggressively in pouring out the need, the necessity, for seeing that the osteopaths and the chiropractors get on at least the staff of our tax-supported hospitals and, if possible, also our private hospitals.

Whether that is important or not, I leave it to the House of Delegates. I am simply a member, here by virtue of being the chairman of a committee. Dr. Gray thought it was important. He expressed the confidence that this organization would take some action, or at least give it consideration by calling it to the attention of the committee to which he thought it related. It is a matter that I want to leave with the House of Delegates, or with the Council, for future action.

Today, in Dr. Sweetser's Committee on Public Relations, he dealt largely with the indigent poor. There isn't any question, from an economic standpoint, that is more important than the handling of the indigent poor at this time. My contention is that scientific medicine, in this rapidly changing age, needs the backing of a strongly organized state medical association, as efficient as possible in all of its personnel and with the wholehearted coöperation of the entire membership of the Minnesota State Association.

As a committee we want to thank you all for the support that you have given our little efforts, and we want especially to thank Dr. Meyerding because of the help he has been able to render us through the Minnesota Public Health Association. With the experience and publicity that the Minnesota Public Health Association has had, we have secured, the members of the committee feel, a far greater value than we could have had in any other way. It was from the Minnesota Public Health Association that the suggestion came of having Dr. O'Brien speak on the radio. With that strong, powerful, lay organization and a strongly organized medical society, we probably can retain the rather enviable position that Minnesota holds today, not only in scientific medicine but in showing the path along economic lines.

PRESIDENT PEARCE: You have all had an opportunity to read the report of Dr. Earl's committee. We will now ask the chairman of the Reference Committee who has considered this report, to make any comments they wish to make.

DR. F. H. MAGNEY: The Reference Committee compliments the Committee on Public Health Education for the excellent work that is being carried on, and recommends the adoption of the report.

PRESIDENT PEARCE: Is there any discussion on the remarks that Dr. Earl has made? I think this question of broadcasting on WRHM is important. What is your pleasure with the report of Dr. Earl's committee?

DR. W. A. COVENTRY (Duluth): I move that it be accepted.

The motion was regularly seconded, was put to a vote and carried.

PRESIDENT PEARCE: The next order of business is the report of the chairman of the Council, Dr. H. M. Workman.

REPORT OF THE COUNCIL

DR. H. M. WORKMAN: "The Council of the Minnesota State Medical Association met for dinner at the Kahler Hotel, Rochester, May 21, at twelve-thirty p. m.

"The following were present: N. O. Pearce, H. M. Workman, F. J. Savage, W. A. Coventry, H. Z. Giffin. W. H. Condit, J. S. Holbrook, W. W. Will, J. M. Hayes, L. Sogge, M. S. Henderson, E. A. Meyerding, O. J. Hagen.

Guests: W. L. Burnap, H. M. Johnson, Mrs. F. M. Brist, F. H. Magney.

"The meeting was called to order at two p. m. by the chairman, H. M. Workman.

"The secretary read the minutes of the previous meeting.

"A report of the finances was given by F. J. Savage.

"R. M. Wilder, chairman of the Committee on Diabetes appeared before the Council and reported on the work of his committee.

"The question of dues of Nicollet-LeSueur County Medical Society, which are in the bank at St. Peter, now being reorganized, was discussed. Motion was made that members of Nicollet-LeSueur whose dues are being held in that bank, receive their membership certificates and also receive MINNESOTA MEDICINE.

"Applications for Affiliate Membership were taken up and acted upon.

"The following amendments to the By-Laws were taken up:

"Chapter V, Section 2.—With the approval of the Council a component society which previously had been entitled to a delegate or delegates upon affiliating with an adjoining component society may retain its right of representation in the House of Delegates provided such society maintains a membership of five or more members.

"Chapter IX, Section 1.—The President and the Secretary shall be ex-officio members of all committees.

"Motion was made that the Committee on Industrial Practice be abandoned.

"A gold plaque, with the following inscription. will be presented to Adolph M. Hanson:

"'Presented to Adolph M. Hanson of Faribault, Minnesota, in recognition of his discovery and isolation of the parathyroid hormone and in grateful appreciation of the distinction thus conferred upon the medical profession in Minnesota by the Minnesota State Medical Association at its Eightieth Annual Session, Rochester, Minnesota, May 23, 1933.'"

I move that this recommendation be approved by the House of Delegates.

DR. F. J. LEXA (Lonsdale): I am from the same county in which Dr. A. M. Hanson resides, and before action is taken by the House of Delegates, I have a resolution to present. In our county we are all in close touch with Dr. Hanson and know him well, and we have great respect and honor for him. He is a man who is practicing medicine and surgery like the most of us in general practice. Naturally, he has a large practice.

In his spare moments he established a laboratory and financed it with his own funds. He has been doing a marvelous lot of work, sometimes working way into the wee small hours of the morning. So far as I know he has never gotten any compensation out of this wonderful accomplishment of his. What he has done, he has done for the benefit of medicine and humanity.

We held a meeting in our county and adopted a resolution, and I as a delegate was to present it to this body here.

"BE IT RESOLVED, That we, the Rice County Medical Society, express our appreciation of the work and discovery of Dr. Adolph M. Hanson, in his isolation of the parathyroid hormone and its application to the treatment of tetany.

"Furthermore, that we commend him for his devotion to ideal, his diligence, the sacrifice of his energy and money in the cause of science as an independent and lone worker, without hope of reward or remuneration; that his surrender of all royalties due and accruing to him under the law, in the form of an outright gift to The Smithsonian Institution at Washington, D. C., meets with our approval, merits our approbation, and is in full accord with the ethics and the best traditions of our profession.

"The secretary is hereby directed to spread this resolution on the minutes of this meeting, and to forward a copy of the same to our State Association and its official publication, MINNESOTA MEDICINE."

I move that this resolution and the one presented by Dr. Workman be adopted.

The motion was regularly seconded by several, put to a vote and carried.

DR. H. M. WORKMAN: "N. O. Pearce reported on the Medical Economics Committee and the subcommittees of the Medical Economics Committee.

"A suggestion was made by Dr. Pearce that a Committee on the Hard of Hearing be appointed by the council."

I move that this recommendation be aprpoved.

PRESIDENT PEARCE: You have heard this motion for a committee to be appointed to study and carry out measures regarding the hard of hearing. This request comes from Dr. Horace Newhart of Minneapolis, who is now or has been president of the National Association. They are carrying on active work, and he thought we should as a State Association take notice of the situation and have a committee appointed who could go to work on it.

DR. W. F. BRAASCH (Rochester): I second the motion.

The motion was put to a vote and carried.

DR. H. M. WORKMAN: "Motion was made to the effect that it would be considered unethical for any member of this organization to sponsor or propose, before the Minnesota legislature, legislation which affects the practice of medicine, until such legislation has had the approval of the Council.

I move the adoption of that recommendation.

The motion was regularly seconded by several, put to a vote and carried.

DR. H. M. WORKMAN: "Motion was made to the effect that the President of the State Association be empowered to appoint a committee consisting of five members, to negotiate with the Board of Control in the administration of funds for the care of the indigent, and that all agreements shall be subject to the approval of the Council."

I move that that resolution be approved.

DR. W. A. COVENTRY: I second the motion.

PRESIDENT PEARCE: I think this particular resolution requires some explaining. The R. F. C. Funds, we are told, are not to be available for payment of the service of doctors, hospitals or medical supplies, so the money that has come from that source, the relief money, has been of no benefit to the medical profession. However, this new Wagner bill which has just passed the Congress, I understand, carries an appropriation of $500,000,000 and does expressly provide that money may be used for medical and hospital services.

In addition to that, the last legislature passed a bill by which it was made possible to issue certificates of indebtedness for relief purchases, and that money, also, as it has been construed, may be used for health purposes, that is, for paying physicians' fees, for hospitals, and that sort of thing.

However, there is going to be considerable work necessary to get the distribution of the medical part of those funds lined up so that the doctors will get their share of it, and so that we will have a smooth

working agreement with the State Board of Control, who probably, in the last analysis, will be the people who will have control of the distribution of the fund.

Dr. Johnson and I have been in touch with the State Board of Control, and they have urged us to appoint a central committee with whom they can confer and make uniform plans for the payment of physicians, for emergency relief. This does not affect and will not affect any plans which any county society has now with county commissioners or with township boards. It will merely be a central committee who will arrange for the distribution of what may be called an emergency fund.

Later it may be that the plan which will be developed by the committee, that has as yet not been appointed, may be comprehensive enough so it may be styled a uniform plan for the payment of physicians, for the care of the indigent, and through the Board of Control, which has a good deal of influence over township boards and county commissioners, such a plan, possibly, might be uniformly adopted throughout the state, even to the point, possibly, of having certain legislation to bring that about.

Before asking for a vote on this resolution, which I think is a very important one and means, possibly, the distribution of a good many thousands of dollars in the next twelve months to physicians of Minnesota, I should like to ask for discussion and suggestions. However, before we do that I am going to as Dr. Magney to give us the recommendation of the Reference Committee.

Dr. F. H. Magney: We have a tentative plan submitted by Dr. Stewart of Hennepin County.

"A tentative plan for coöperation between the Minnesota State Medical Association and the federal and state government in the medical care of the poor.

"The Medical Association of the State of Minnesota adopts the general policy that its members will take care of all charity cases at a total cost within the funds appropriated by federal and state government, regardless of the amount of service that is required.

"The equitable distribution of funds in payment for service will be decided by the Medical Society, based upon the amount of service rendered by each member.

"Cases to be classed as deserving of charity are to be certified by the local county commissioners. Local societies are required to keep accurate records of the work they do; otherwise, they are not eligible for reimbursement for services rendered.

"Tentative plans to be perfected in detail later."

The Reference Committee recommends that this be brought up for general discussion.

President Pearce: They are working on a plan in Illinois, and Dr. Wright who was just down there is familiar, to some extent, with it so he can open the discussion.

Dr. C. B. Wright (Minneapolis): They have been getting money for this purpose in Illinois. I think the funds came from the R. F. C. They have a very complete set-up for the handling of these funds. I heard the social service worker talk before the House of Delegates of the Illinois Association and outline the scheme. I talked to Dr. Pfeiffenberger who lives in the county where they have been getting some of this money.

Their scheme there is to work on a fee basis, through a local committee of the local society, which is a secret committee, and passes on all fees that doctors charge for their services. He said that it worked very well. Of course, the reason for having committees that are not generally known is the fact that nobody would go on the committee otherwise, because of the fear of meeting with a good deal of criticism if they modified the fees that the doctors had charged for the work. He said that as far as the work was concerned, it went very well, that the coöperation was good. This worker said that from their standpoint they got very good coöperation from the profession, but when they all got through the money had been spent for food, clothing, and other things, and there was nothing left for the doctor. I would like to call attention to that experience.

I would also advise this committee to get in touch with the men in Illinois and get the details of their set-up because they have had considerable experience with it. Of course, it is the usual story that when the doctor goes into one of these schemes, he does the work and there is no money left with which to pay him. Whether we should demand pay for this type of work or not is controversial within the profession itself.

Dr. W. L. Burnap (Fergus Falls): I would like to suggest that there should be money appropriated for this purpose, but we could not decide here tonight the details of handling. The probability is it should be left to the Council as to how it should be handled. I would suggest that whatever is done be left to the Council.

President Pearce: I would like to get the reaction of the House of Delegates on two things. Should this committee be appointed, would it meet with the approval of this organization if they should make a contract or an agreement with the people who have this money to spend, that the work be done, let us say, for 50 per cent of our usual fees? Should it be 75 per cent? I don't think we should pass a resolution to that effect because we don't want to bind the hands of the committee.

A suggestion came from a rural member that certain fees should hold for certain mileage but that beyond that mileage the fee would get very small, the idea being that the work should be divided among the men who are nearest to the place, rather than having one man going twenty-five miles from his home or from his office to make a call on someone, and then sending in a bill for that long trip, when there probably is a man not over three or four miles away who could do the work just as well.

The State Board of Control tell us that they are anxious to see the physicians get paid for their services but they feel that the physicians sometimes are unfair, that, knowing they are going to get the money from the state or the county or township, bills have been turned in which were obviously 50 per cent higher than their normal fees.

It would help the committee considerably if they had an expression of opinion on those two questions.

Dr. J. S. Holbrook (Mankato): Am I to understand that this is to take the place of the Board of Control?

President Pearce: A great many of these townships and counties are broke. They have fixed sums of money to pay for certain fixed things, but from a relief standpoint they are broke. The only money they will be able to dispense for relief is money they get from the state and national government. The State Board of Control will have a great deal to say about how that money is dispensed. It will have nothing to do whatever with the regular agreements that are now in existence between county societies and county commissioners, or township boards and physicians.

Dr. H. M. Johnson (Dawson): The Board of Control informed me that only counties that were absolutely broke and could not take care of the sick would be permitted to get loans. So in the counties where they still pay their bills and are still doing business and are solvent, I don't think we will get much advantage from this.

Dr. B. S. Adams (Hibbing): This is so new and we have so little information and know so little about what can be done and will be done, and as long as we can't decide anything ourselves, we had better leave it to the Council and let them use their best judgment.

Dr. W. A. Coventry: Some of the funds that we have been getting from the R. F. C. have specified what they should be used for. I don't think medical service has been included in the specifications. Doctors have

been paid in these counties from the county funds. In our county we have two funds, what we get from the R. F. C. and what we get from taxation. Doctors are paid with what we get from taxation. The money from the R. F. C. can only be spent for groceries and bare necessities.

Dr. C. B. Wright: I would like to correct my statement. I remember now that was not from the R. F. C. but from the $6,000,000 sales tax, which was afterwards thrown out by the Supreme Court. They owe all this money, and I don't think they have anything with which to pay it.

President Pearce: Is there any further discussion? Dr. Workman's motion was to the effect that the President be authorized to appoint a committee of five to confer with the State Board of Control or any other state organization that might have charge of these funds, and that they be empowered to make such agreements as they see fit and which are approved by the Council.

If there are no further remarks, all those in favor of the appointment of this committee will signify by saying "aye"; opposed. The committee will be appointed.

It is now in order to accept the report of the chairman of the Council.

Dr. W. F. Braasch (Rochester): I so move.

The motion was regularly seconded.

President Pearce: Is there any discussion? You have heard the motion for the approval of the report of the chairman of the Council. All those in favor will signify by saying "aye"; opposed. It is carried.

The next order of business is the report of the president. I am afraid you are going to hear too much from your president before this meeting is over, and I haven't any remarks to make at this time. I will make my remarks as we go along.

We will now have the report of the secretary.

REPORT OF SECRETARY

There is no doubt at all that our system of medical practice is undergoing a serious, aggressive and systematic attack.

The majority report of the Committee on Costs of Medical Care, together with its five years of investigation and publicity, have contributed to this attack. Using this report as a basis, however, a more vicious and effective campaign is now being carried on in newspapers and magazines, by radio and public platform than ever before. The speakers enlisted in this propaganda are usually men of high educational qualities, members of the faculties of higher learning, members of Women's Clubs, etc. The object is to discredit physicians and to point out fallacies in current methods of practice.

Inspired stores appear in every type of publication from the greatest to the humblest, as part of this campaign. They appear with attractive captions and headlines. The material in them is subtle and suggestive. Always it infers that the day is not far off when a new era in medicine will be here. The following captions are typical: "The Medical New Deal;" "The Art of Medicine;" "Medical Group Examines 4,000 in Two Months."

We must not underestimate the activity of the Committee on Costs of Medical Care and the campaign of the lay social worker to control medical practice. Strong organization and a vigorous defense of the ethics, the traditions and worth to the public of the independent, private physician is the first obligation of the medical man who loves and reveres his profession.

Your Secertary believes that it is important that one of our committees make a special study of this subject and prepare a speakers' outline so that any physician may have available suitable information for talks. We should also outline information for the Women's Auxiliary so that they can counteract this propaganda that we know is being put forth in our own state.

DECEMBER 18 MEETING

On December 18, 1932, a meeting of some 800 physicians was called at the Nicollet Hotel, Minneapolis, to hear prominent speakers discuss from all points of view what the reports of the Committee on the Costs of Medical Care may really mean to us and to the public.

The impressive talks made at this meeting have done much to solidify and fortify the medical organization in Minnesota in opposition to unsound schemes for group practice and insurance medicine. The meeting was reported in great detail in the March issue of Minnesota Medicine, which took its place in the interesting and much sought after symposium of medical opinion upon the work of the Committee on the Costs of Medical Care.

COMMITTEES

In 1933, there have been added six committees, most of them working on some special problem.

The Committees that have been most active are: State Health Relations Committee, in the study of the care of the indigent sick; the Committee on Public Health Education, in counteracting the propaganda of the advocates of the majority report of the Committee on the Costs of Medical Care; the Committee on Public Policy and Legislation; and the new Committee on Diabetes.

NEWSPAPER SERVICE

Our newspaper service is now serving 340 papers in the State of Minnesota, more than half the papers published. It is also used in parts of Wisconsin. Many large Twin City dailies regularly publish our stories in spite of the fact that they also carry regular syndicated health services.

We should remember that when this service was commenced some seven years ago, less than one hundred papers would accept it. It was inaugurated in response to a demand on the part of the medical men of the state that some legitimate news be offered the papers to counteract the propaganda of cultists and advertising quacks.

We must take it for granted that the newspaper man requires and will get some kind of health information for his readers. The public demands such information. It is natural that he should accept whatever health information comes his way easiest if it appears on the surface to be all right. He has not either the ability or the time to discriminate. Our newspaper service, bearing the authorization and approval of the legitimate medical profession, was inaugurated to supply the newspaper man with obviously authentic health news and the truth about the practice of medicine in a form which involved a minimum of work on his part. It goes without saying that the intelligent editor prefers to give his readers facts when he can get them.

As I recall it, those who urged the newspaper service upon us seven years ago, sent in clippings from the editorial columns of several Minnesota newspapers extolling a fake diagnostic apparatus that diagnosed disease by a hair or a drop of blood. Many papers, such as one in Alexandria, were using the McFadden news service. There were also several osteopathic and other such services. Any cultist or quack who could write his story had a good chance of getting into print. Our service has done more than its originators hoped, to counteract this type of quack publicity.

INVITING IN THE EDITOR

It is important in this connection, that the editor and the local physician all over the state understand each other's aims and problems. Some editors, for instance, still maintain that health education supplied by the pro-

fession is advertising and should be paid for as such at regular advertising rates. Or, at least, that such education in the news columns should be accompanied by paid advertising by physicians. Every affiliate medical society should, by all means, have at least one general get-together meeting each year with an important local group. Newspaper men should be invited, county officials, including the judge and the county attorney, county commissioners, the mayor and members of the legislature.

It is not necessary to have a special program for this occasion. In fact, it is advisable to have the regular scientific program with the addition of some economic discussions and a dinner. Such a meeting will make the newspaper men happy and serve to iron out many misunderstandings that still exist not only with the press but with other professional men, politicians and officials.

A word of warning is necessary. Medical societies that plan such meetings should ask newspaper guests not to report the meeting in their papers. Newspaper accounts under such circumstances are all too likely to make use of names and, perhaps, to misconstrue things said in the course of discussion.

The goodwill of the newspaper man is all important to organized medicine and the doctor should understand that his own account of any meeting might be just as bad from a newspaper man's point of view as the latter's uncensored report for which he has no background of a medical meeting.

Too much cannot be said, however, about the importance of extending the economic meetings of the affiliated county societies. One such meeting, at least each year should be held for members alone. It should precede the gathering to which outside guests are invited.

STATE BOARD OF MEDICAL EXAMINERS

The close contact between the Secretary and the State Board of Medical Examiners and the Basic Science Board has been maintained. The fact that it has been necessary to allot $3,000 from the budget of the Minnesota State Medical Association to the prosecutions of the State Board of Medical Examiners will, of course, curtail the Association's program. But it is appreciated by all that the legal prosecution of the unqualified individual is of the first importance to the public and ourselves.

THE PRESIDENT

The president, N. O. Pearce, has been active not only in visiting the various societies, but in stimulating his committees to study certain special problems. Chief among these special economic problems are the relationship of the profession to the insurance companies, the oversupply of medical men, the care of the indigent, contract practice.

THE 79TH ANNUAL MEETING

This was the largest and most successful meeting in the history of this organization. The large and sustained attendance indicated that this is the type of meeting our members desire. The total registration for this meeting was 1,734. The expense of the meeting to the Association was approximately $500 less than the year before. This was due, of course, to the income derived from commercial exhibits. You are urged to visit and patronize our exhibitors whenever possible. It is they who help to make possible our interesting and attractive meetings.

HEADQUARTERS

The close relationship between the Minnesota Public Health Association and the State Medical Association continues to be of equal importance to both organizations.

Everybody's Health, the monthly magazine that goes to every school in the state, and to some 20,000 other subscribers, is having a difficult time financially. We hope the medical profession will keep in mind the ethical plane that this publication has attempted to maintain, which is in a degree responsible for its financial stringencies. The profession should also keep in mind the value of this publication, going, as it does, to every school, hospital, and library in the state, and to many homes as well. Part of its definitely outlined program is the creation of goodwill toward the practicing physician. *Everybody's Health* should be in the waiting room of every medical man and dentist in the State of Minnesota.

HEALTH SPEAKERS

The close contact that has been maintained for some years with the Women's Federation, the Parent-Teachers' Associations, the Minnesota Postmasters, etc., has been continued during 1932, and will continue in 1933. Prominent speakers and entire programs have been left to your secretary for his arrangement, much to the expressed pleasure and interest of these various groups, and the satisfaction of the profession. Formerly, objectionable speakers were not infrequently placed upon these programs. We wish to thank the Women's Auxiliary for their coöperation in bringing about this situation.

STATE SECRETARIES CONFERENCE

The Annual Conference of Secretaries of component medical societies was held at the Lowry Hotel, Saint Paul, on February 18, this year. Twenty-six county medical societies were represented. The subjects which occupied the greater portion of the day were Workmen's Compensation, Mal-practice Insurance Rates and 1933 Legislative Problems.

It is gratifying that these annual meetings of the Secretaries are producing satisfactory results. We have now a splendid, energetic and interested group of Secretaries in our affiliate societies. We look forward to much improvement within the next few years in the business management and increased standards of business efficiency in our lay relationships.

REGIONAL CONFERENCE

Officers and representatives of nine state medical societies gathered for the Annual Regional Conference held in 1933 as formerly on the Sunday following the Secretaries' Conference, February 19. This conference provides the only opportunity for discussion of common problems among Northwest physicians. As such it is deemed highly valuable and will be continued with St. Paul as the meeting place. Forty-eight men attended the 1933 meeting.

COMPENSATION FOR SERVICES OF THE MEDICAL MAN

It is high time that medical men through their organization establish some definite principle concerning services for which they now receive little or no compensation. That there should be compensation for medical service for the indigent as well as for their food, heat, etc., is a principle that is not as generally accepted as it should be particularly among those who administer relief. Some successful endeavors have been made here in the Northwest looking to fair compensation for medical services to the indigent.

It is unfortunate, however, in Minnesota that legislation was threatened in at least two instances in our recent legislature that endangered this principle. We are referring to Bills H.F. 769 and H.F. 1867.

Your secretary wishes to commend the service rendered by Dr. Theodore H. Sweetser, chairman of the Committee on State Health Relations, for his study and extensive research into this question of the care of the indigent.

The time has certainly come for the medical profession to step in and assist in organizing medical care for the indigent in many of our counties in Minnesota.

Certain counties are now prepared to undertake such a program but serious obstacles, some of which the medical men themselves are not conversant with, have prevented. If authority should be given the secretary's office to obtain such special assistance as is necessary to assist in completing these programs, the profession would be repaid many times in the years to come for the expense entailed, we believe.

VETERANS' LEGISLATION

New veterans' legislation recently passed by Congress at the request of President Roosevelt to re-organize benefits to veterans and to limit government building of hospitals, is the climax of a movement started three years ago in our House of Delegates.

At the sixty-second annual meeting of this society held at Duluth, in July, 1930, this office suggested that health insurance policy be issued by the Veterans' Administration to replace the building of additional hospitals. That fall your secretary collected approximately $400 in collaboration with the Minnesota Public Health Association. the late Dr. H. Longstreet Taylor, who contributed $150 from the Pokegama Sanatorium and Dr. H. M. Johnson to send a delegate to the American Legion meeting at Boston. The object was stimulation of interest among veterans in curtailing increase in government beds and in the use of existing private and public hospital facilities. The subsequent history of the American Medical Association's participation in the activity on this matter is of common knowledge.

This activity has obviously borne fruit. Government care of war veterans is now being put on a much firmer and sounder basis than formerly and this new order is due in some measure, at least, to the fact that the Minnesota State Medical Association is an alert, forward looking organization with members who are interested, not only in the medical profession but in the country as a whole.

RADIO PROGRAM

Dr. W. A. O'Brien entered his sixth year of weekly broadcasts on health under the auspices of the State Association this year. The popularity of these talks is attested by the volume of mail that continues to come in.

AMENDMENTS TO THE CONSTITUTION

The words in brackets have been eliminated. The newly added words are printed in CAPITALS.

Article IV: Section 4: AFFILIATE MEMBERS (emeritus members) shall be those members of component district or county medical societies, WHO UPON THEIR OWN REQUEST, having held membership for a period of twenty-five years in this Association, and having reached the age of (sixty-five years) SEVENTY YEARS, or who through physical disability are unable to engage in active practice, (and who, upon their own request to their district or county society), shall have been declared Affiliate Members of (such district or county societies) THEIR OWN DISTRICT OR COUNTY MEDICAL SOCIETY AT ITS REGULAR MEETING, SUCH ACTION HAVING BEEN APPROVED BY THE COUNCIL.

Article V: House of Delegates: The House of Delegates shall be the legislative and business body of the Association, and shall consist of (1) Delegates elected by the component county and district societies, (2) Councilors, (3) The President, (4) The President-elect, (5) Ex-officio Secretary and Treasurer, (of this Association) (6) PAST PRESIDENTS WHO SHALL BE ENTITLED TO THE PRIVILEGES OF THE FLOOR BUT WITHOUT THE RIGHT TO VOTE.

Article VI: Council: The Council shall consist of the Councilors, the President, the President-elect, THE IMMEDIATE PAST PRESIDENT, and ex-officio the Secretary and the Treasurer. Besides its duties mentioned in the By-Laws, it shall constitute the Finance Committee of the House of Delegates. A majority of Councilors shall constitute a quorum.

NEW SOCIETY

Amalgamation of Olmsted and Houston-Fillmore under the name of Olmsted-Houston-Fillmore County Medical Society will be completed with this meeting. The charter of Dodge County Medical Society has been withdrawn and the members have affiliated with Olmsted-Houston-Fillmore Society.

ROSTER TO PROBATE JUDGES

The roster was sent to members in each county seat with request that they give it personally to the Judge of Probate of their counties. The roster was sent also to all Insurance Companies represented in Minnesota.

LAWYERS' BROADCASTS

We note that the legal profession are broadcasting every Sunday afternoon and that the leading legal and public officials of national repute are not afraid to mince words in presenting the importance of the lawyer. Within the past month discussions as to the impropriety of banks, trust companies, etc., giving legal services were presented. The speaker emphasized the important fact that no man can serve two masters with equal honesty and efficiency. For example, when you go to a corporation to have them draw up your will, you are in danger of having your future wishes subordinated to the interests of the corporation for which the employed attorney is working.

The same argument applies to the medical profession and I think we can learn much from the publicity program put on by the lawyers. We will hear Tuesday night, May 23, from His Excellency, John Gregory Murray.

SUPPLEMENT

ORGANIZED MEDICINE AND THE CURRENT ECONOMIC SITUATION

Certain groups and state organizations that should have known better have criticized organized medicine because it has not made loud announcements of a public program of medical relief during the economic crisis. These criticisms cannot be ignored because they are in danger of injuring us substantially in the minds of the less intelligent but occasionally influential people. The fact is, of course, that the medical profession has made a greater sacrifice in these last years perhaps than any other group in our society.

To paraphrase a popular phrase, we might well ask our critics "What did you do, Sharlie?"

Little if anything beyond glowing announcements and expectations have been accomplished, to our knowledge, by some of the noisiest of these organizations. In the meantime, of course, the doctors, individually, and as a unit have taken care of those in need as far as physically possible. They have done it in the form of charity and also in the form of indefinite extension of credit to whomsoever asked for it. It is common knowledge that the doctor is the last to be paid. He knows it and expects it and yet he has contributed in work and time and actual medical supplies far more than ever before.

If your critics had come to your secretary's office he would have informed them of these facts and also of current efforts on the part, not only of the State Association, but of the various affiliated medical societies who are studying the problem of extension of medical and hospital services to those in need.

In order to have some definite information as to just what the Minnesota State Medical Association has been doing to help out the needy, a questionnaire was sent recently to practically all members. More than 40 per cent have replied.

These replies indicate that the average percentage of charity work—work that is not put on the books by our

members—is more than 27 per cent; that the average member is carrying about 51 per cent of his accounts on credit, and that he is collecting about 49 per cent for the work that he does.

It is interesting to note variations in the responses to the questionnaire. Some of these variations are undoubtedly due to differences in business efficiency of our members.

SPECIMEN TABULATION

Charity Work	*Credit*	*Collection*
10%—81	10%—14	10%—11
50%—77	50%—101	50%—125
75%— 5	75%—50	75%—51

(The figures in the second column under each head indicate the number of physicians.)

It is worthy of note, also, that your State Association and its affiliated county societies have consistently maintained their public education program by newspaper and radio, doing their part to give needed public information about diet requirements and disease prevention. Your organization has not, like so many others, cut its budget and reduced this really important contribution to the health of our population. There should be no question in the minds of anyone as to the actual contribution of medicine in good times and bad. Unfortunately we are forced to the conclusion that some of these critics are not ignorant at all, but rather, malicious.

REFORESTATION CAMPS

We note with pleasure that the Reforestation camps, now being established by President Roosevelt, adhere to the basic principle for which the medical profession contended so strenuously in the handling of the problem of care of veterans.

This is the principle involved in use of already available civilian hospitals and civilian physicians when federal hospitals are not at hand.

We are further gratified to note that no new federal bureau is being organized to administer the reforestation program. The only agencies involved are the United States Army and such local physicians and hospitals, as shall be needed.

There is good reason to believe that this is a deliberate gesture on the part of the new administration, an indication of what is to be its policy in all departments. Incidentally it lends no aid or encouragement to the suggestions for tax supported medicine recommended by the majority of the Committee on Costs of Medical Care.

RELIEF FUNDS FOR MEDICAL AND HOSPITAL CARE

At the time of this writing, information has come to the secretary's office to the effect that the United States government will allow medical and hospital care to be paid for out of the $500,000,000 appropriated for relief by the so-called Wagner bill. State relief funds alloted by the last legislature may also be expended for this purpose. Your President has appointed a committee consisting of himself, H. M. Johnson, chairman of the Committee on Public Policy and Legislation and T. H. Sweetser, chairman of the Committee on State Health Relations, to discuss and formulate plans with the proper authorities, for administering these funds.

It is gratifying to observe that the medical profession and its services are now recognized as demanding recompense equally with dealers in commodities, fuel, food and clothes. It is to be hoped that organized medicine in Minnesota will respond to this recognition by rendering every possible assistance to the just administration of funds in this state. Your State Association seems at this time to be the logical unit to cooperate in this matter with state authorities.

SECRETARY MEYERDING: My original report was sent out, and then I had a supplement passed out this evening.

I want to explain who Mr. Soule is, the man Dr. Earl spoke about. He is the paid agent of the Anti-vaccinationists, the Anti-vivisectionists, the Medical Liberty League, and that group of people. He is the man who, in the past, has put a bill in the legislature that permitted all cultists to take patients to hospitals. He stopped following around the legislature this last time.

He has been talking over WRHM for some days at eleven-five. He has a variety of subjects. You know, the Rosedale Hospital at Minneapolis is closed. In the past they used a great deal of time on WRHM. Since they are off, WRHM has a lot of free time. The radio companies are like newspapers, they hire people to write or talk for them. He probably is one of their features.

Mr. Soule is also the man who published what is known as the *Masonic Observer*, for a good many years.

After writing this original report, we had heard (we had heard it before but it didn't register) that certain groups in our state had complained that organized medicine had done nothing in an organized way to help out the public who were in need during this great economic crisis. It came from sources such as welfare workers, nurses organizations, et cetera. We thought they should know better.

Accordingly, just to have some facts, we sent out a questionnaire, which you all received. It was limited to about 1,700 copies We received pretty nearly 700 replies.

In addition to that, your Association committees have been going full blast. You have kept up your dues and your budget. They have been doing all the educational work and assisting the public and protecting them by giving them the information that you always have given in times of prosperity and which, in time of depression, is a more important thing.

In the last number of the *American Medical Association Journal* there is an editorial by Dr. Fishbein on what the government has done in regard to taking care of that quarter of a million men who are doing reforestration work. They are taking care of them just exactly as you proposed some four or five years ago that the government take care of the veterans.

DR. C. B. WRIGHT (Minneapolis): I would like to say one word. That particular thing was recommended by the committee of the A. M. A. that sat in with the President on the set-up. They recommended that the local doctors should be used. There was a set-up there by which they were going to use, as I understand, men discharged from the service, Army men and so forth, but they were able to convince them that the local physicians should be used in the districts where this work was going on, wherever possible, and that the local hospital should also be used and be paid for their services.

PRESIDENT PEARCE: We will hear the recommendation of the Reference Committee.

DR. F. H. MAGNEY: The Committee, on reviewing the excellent report of the secretary, which made so many valuable suggestions, without going into detail, would call your attention particularly to the following:

"1. The advisability of preparing a Speakers' Outline containing information which would be suitable for any physician to employ in combating the propaganda put forth by the proponents of the Majority Report of the Committee on the Costs of Medical Care, and that this be referred to the Committee on Public Health Education.

"2. His recommendation that the county society, wherever feasible, have a meeting, if possible annually, to which should be invited the members of the press, the legal profession, and other officials.

"3. We call your attention also to the data collected by the secretary in regard to the amount of charity work which is done by members of our profession. He finds that about a third of the work of every member of our Association is charity work, and that more than one-half of the balance is carried on credit."

We recommend that the report be accepted.

DR. C. L. SCOFIELD (Benson): I second the motion.

PRESIDENT PEARCE: We have a motion for the acceptance of the secretary's report, and you heard the recommendation of the Reference Committee. Is there any discussion? If there is no discussion, all in favor

of the motion signify by saying "aye"; opposed. It is carried.

We will now have the Treasurer's report.

Dr. W. H. Condit read his treasurer's report

TREASURER'S REPORT

Period—December 31, 1931, to December 31, 1932

RECEIPTS

Balance on hand Dec. 31, 1931		$ 2,965.21
Dues Collected:		
Deposited in Checking Fund	$28,711.50	
Interest on Checking Fund	66.65	28,778.15
Total in Checking Fund		$31,743.36
Deposited to Savings Fund	$11,875.00	
Interest on Savings Fund	226.13	
Total in Savings Fund	$12,101.13	
Less: Transfer to Checking Fund:		
July 1, 1932	$5,000.00	
Oct. 1, 1932	5,000.00	10,000.00
Balance in Savings Fund		2,101.13
TOTAL RECEIPTS		$33,844.49

DISBURSEMENTS

Annual Meeting		$ 2,597.88
Conferences		818.64
Consultation Bureau		75.00
Council		260.05
Educational Fund		3,043.06
Historical Committee		235.62
Hospital and Medical Education		18.82
Legal		.....
MINNESOTA MEDICINE		4,000.00
Public Health Education Com.		3,953.57
Rent		300.00
Secretaries' Conference		528.31
Secretary's Salary		4,200.00
Secretary's Traveling Expense		472.14
State Health Relations		85.61
Stenographers and Clerks		2,454.00
Treasurer's Salary and Expense		101.50
Miscellaneous Items:		
Furniture and Fixtures	$ 59.05	
Office Supplies	85.19	
Postage	284.84	
Printed Matter	169.24	
Telephone	268.90	
Telegraph	23.52	
Miscellaneous	361.88	
Unbudgeted Com.	247.70	$ 1,500.32
Bruce Publishing Company:		
Deficit for year 1931	$1,726.26	
Payment 102 members over 2,000	204.00	$ 1,930.26
Refunds over payment of Dues:		
Upper Miss.	$37.00	
Wright Co. Med. Soc.	1.00	
Park Region Dist.	3.00	
So. Western Minn. Med. Soc.	1.00	
Meeker Co. Med. Soc.	15.00	$ 57.00
TOTAL DISBURSEMENTS		$26,632.78
Balance on Hand		7,211.71

The amount, $28,711.50 deposited in the checking fund includes $100 from Olmsted County, a contribution for a speaker at our meeting in Saint Paul, also $500 transferred from the technical exhibit fund of the last state meeting, both credited to the annual meeting. That left a balance from that fund of $485.75, which was left in the technical exhibit fund for current expense.

The item "Deposited to Saving Fund" may be ambiguous. It isn't deposited in the reserve fund; it is deposited in the savings fund of the bank. We have to specify that because we get more interest in the savings department than we would get in the checking department, so we transferred $11,875. . . .

DR. CONDIT: If any of you took the trouble to check up on those figures you probably found they did not balance by one dollar. The first item of disbursements, "Annual Meeting $2,597.88" should read "$2,598.88." It was simply an error in making the copies that you received.

You have this report. You can go over these items.

PRESIDENT PEARCE: Dr. Magney (Reference Committee).

DR. F. H. MAGNEY: The treasurer's report has many phases which deserve our commendation. We refer particularly to those items which show a careful economic policy.

PRESIDENT PEARCE: A motion will now be in order to accept the report.

DR. C. L. SCOFIELD (Benson): I move the acceptance of the report.

The motion was regularly seconded.

DR. F. J. LEXA (Lonsdale): From last year's report I understood there was a special fund. I wonder what became of the fund. It was a bond investment, wasn't it? What was the amount.

PRESIDENT PEARCE: That is a separate fund and will come up under another head.

I would like to make clear one point. There is an item of $100 that was from Olmsted County. We have to thank Dr. Melvin Henderson, who was president of the society last year, for geting that money for us. They were running into a great deal of expense, and when the meeting was held in Saint Paul Dr. Meyerding was getting a little bit worried. Dr. Henderson was able to get the $100 from the Olmsted Society for that purpose. I think we owe the Olmsted Society and Dr. Henderson a vote of thanks for that contribution.

Is there any other discussion? If not, all those in favor of the motion to accept the report of the treasurer will signify by saying "aye"; opposed. It is carried.

In order that we may dispose of this matter of the special fund, I am going to ask Dr. Savage, who is one of the Committee on Fiscal Agency, to explain that.

DR. F. J. SAVAGE: Mr. President, this is the trust fund which is being handled by the First Minneapolis Trust Company and invested in bonds of various kinds. I will be glad to read the list if you would like to have me do so. The carrying value of these bonds is $25,713.01. This report is of April 1. The market value shows that with the current depreciation, if we had to sell these bonds, they would realize $21,054.08.

PRESIDENT PEARCE: You have heard Dr. Savage's report. A motion for its acceptance will be in order.

DR. E. S. BOLEYN (Stillwater): I move that it be accepted.

The motion was regularly seconded.

PRESIDENT PEARCE: Has the Reference Committee anything on this?

DR. W. H. COVENTRY: It might be well to make a comment on this fund. In previous years, up until the last two or three years, this fund was entirely in the care, as far as buying new bonds was concerned, of the Minneapolis Trust Company. In the last three or four years the Councilors thought it best to have a committee, called the Fiscal Agency Committee, of which Dr. Savage is chairman, with Dr. Hagen and myself as members. No bonds are purchased or have been purchased in the last two years without the o.k. of this committee. Before that time it was just carte blanche with the bank, and they could do just as they pleased. We are not kidding ourselves about the value of those bonds that we purchased in the last couple of years, but they haven't depreciated very much in value.

DR. F. J. LEXA (Lonsdale): I think that committee should be complimented on the small depreciation. They have done real well.

PRESIDENT PEARCE: Is there any further discussion? If not, all those in favor of the motion to accept the report of the Fiscal Agency Committee will signify by saying "aye"; opposed. It is carried.

The next is the report of the Delegates to the American Medical Association. The Delegates are Dr. John-

son, Dr. Wright and Dr. Braasch. Have the delegates anything to report?

Dr. W. F. Braasch: We reported at our last meeting. The American Medical Association met prior to the last meeting of the Minnesota State Medical Association. We can't very well report the next meeting, but we will do so next year.

President Pearce: We are going to ask Dr. Wright to report on the Regional Conference.

Dr. C. B. Wright: I might say just a few words about this organization. It was originally started by Dr. Braasch when he was president. The idea was to get together the official representatives of the state medical associations around us here and talk over mutual economic and other questions which related to the practice of medicine.

In the beginning there were two states, Wisconsin and Minnesota. Last year we had representatives from Wisconsin, Illinois, Iowa, Nebraska, North Dakota, South Dakota, and Wyoming. There were some fifty men in attendance. There were many men from our own organization. It was at the time of the Secretaries' Conference. Every man in the House of Delegates should attend those conferences, because men who really were quite well informed on various economic questions, spoke. For instance, Dr. Leland of Chicago gave a report of three years on various insurance schemes for the care of the sick. Dr. Scammon gave an interesting talk on medical schools and how much they should practice medicine.

Dr. Neal, who is president of the Illinois Society, gave an interesting discussion on how they handle legislative problems in Illinois. Their system is different than ours, but it is effective in Illinois. It would not do here, in my opinion. I don't think Dr. Neal's system would work in Minnesota because in this country you have to speak at least one Scandinavian language, probably better if you speak two.

Our Legislative chairman is fortunate, as I understand it, in being half Norwegian and half Swedish. I am sure that gives him an influence which one can hardly estimate in the state of Minnesota.

In addition to that, we had from Iowa a report on their plans for handling the care of the indigent. We have various other subjects, as the cost of medical care, the report of the Majority Committee and various aspects of it, for and against, were discussed.

I hope this organization will continue, and draw more and more representatives. It is a valuable conference.

President Pearce: Dr. Magney, has the Reference Committee anything to report?

Dr. F. H. Magney: No comments.

President Pearce: A motion for the acceptance of the report of the Committee on Regional Conference will be in order.

Dr. C. L. Scofield (Benson): I move that we accept the report.

The motion was regularly seconded, was put to a vote and carried.

President Pearce: We are now going into the committee reports. Because of the vast number of reports and because we want to have time for discussion by members of the House of Delegates, I am going to offer to the chairman of these different committees the privilege of having five minutes in which to emphasize any special things in their reports and to make any additional comments they may have omitted in the original report.

We have heard Dr. Earl's committee report. The next one is that of the Committee on State Health Relations by Dr. Sweetser.

Dr. W. H. Coventry (Duluth): Wouldn't it facilitate things if, instead of calling for a motion and waiting for somebody to second it, on each report, and there seems to be no disapproval, the Chair would rule that the report is accepted? That would save a lot of time.

President Pearce: Is that the sense of this meeting, that instead of putting this motion each time for approval, if there is no objection the Chair will rule that the report is accepted? (Agreed)

REPORT OF COMMITTEE ON STATE HEALTH RELATIONS

1. Care of the Indigent: The Committee has on file (available to those interested) copies of plans in operation and contemplated in this region. Opinion has been secured from Mr. F. Manley Brist as to the legality of the various plans in Minnesota. A plan has been evolved with his coöperation which should remove the possibility of any legal difficulties. Copies of this plan will be available to any of the local medical societies interested. Again this year your Committee offers any of the component societies its help in the establishment of such a plan.

This committee requests the Council to give more consideration even to the extent of financial support, to the promotion of this plan.

2. Care of obstetrical cases in some parts of the State has become a serious problem. Councilors and delegates from those districts have been asked to be prepared to discuss the problem at the State Convention.

3. The State Board of Health has appointed the chairman of this committee as a member of its Advisory Committee on Tuberculosis Program for the State. Dr. Chesley has offered to send to our committee copies of any report made by that committee before its publication.

4. The State Board of Health suggested a joint committee to propose some plan for venereal treatment of certain veterans whose treatment by the Veterans' Bureau has been discontinued; a subcommittee of your Committee on State Health Relations has been appointed for that service should it be called.

5. Determination of proper charges for diphtheria inoculations for groups of children (summer round-ups, etc.) is a problem for the local medical societies. In view of the frequent requests for information referred to us by the State Board of Health, it seems that the local medical societies would do well to formally consider the matter and determine charges which would be fair to all concerned.

Respectfully submitted,
T. H. Sweetser, M.D., *Chairman.*

Dr. T. H. Sweetser: I think you all have the report of this committee. The Reference Committee will discuss one or two points in the report.

Under the paragraph on "Care of the Indigent," the Reference Committee suggested that I give you an idea of the plan which we have drawn up and recommend for use in Minnesota. We want to emphasize that we simply have this on file for any county society which is interested and would like to take the matter up. We also have a number of other plans on file. We spent a good deal of time on the plans and got an opinion from Mr. Brist as to the legality in Minnesota of the different plans, and then drew up our own plan as a composite of the best features of the different plans in use in Iowa, Wisconsin, Duluth and other places, and then referred this modified plan to Mr. Brist for his approval.

In Minnesota, in order to get away from competitive bids, which are so pernicious, we have drawn up a plan on the basis of appointment.

We feel that some plan for care of the indigent by all the doctors of the local medical society will help to give a unity of purpose to the local society, and will help to keep the members together and prevent friction. They will all have one thing to work for, and one man will not be getting a salary as county physician while the others do the work. I think it will make for good feeling.

On the other hand the good feeling and unity of pur-

pose among the doctors are essential prerequisites in setting up the plan. One doctor who refuses to cooperate may wreck the entire undertaking. In establishing such a plan, I want to emphasize that there is no use in trying to do it the way you have done it in one or two counties—call the county commissioners together and then begin discussing it. You have to prepare the ground ahead of time. The doctors should first know what they are talking about, and should agree on the details of the plan to be proposed, and then should go and talk it over with the commissioners and officials informally, and let them know what the proposition is so that they understand it thoroughly and will not be carried away by somebody's half-baked opinions. Not only that, you have to have the facts. You have to know how many cases the other doctors who are not county physicians are now taking care of for nothing.

Then use a little tact, as Dr. Herman Johnson does. The Commissioners appreciate the value of proper judgment and advice from the doctors, and they are not going to tip over the whole arrangement and hire somebody else because it will be a few dollars cheaper. You keep everybody educated, including the auditor and the commissioners and this thing will go across. If you can do it sufficiently well, you might even put over Dr. Johnson's plan that he has up in Lac Qui Parle. That is a better plan, from the point of view of the doctors, if you can put it across and make it stick.

Dr. F. H. Magney: The Reference Committee recommends the excellent report submitted by the Committee on State Health Relations, which merits considerable discussion.

We call your attention especially to Section 5 which deals with the charges for diphtheria inoculations for groups of children and recommends that this be a matter for the local county society to decide, with the recommendation, however, that some charge should be made for inoculations of this kind.

President Pearce: You have heard the comments by the chairman of this committee and the comments from the Reference Committee. I think the work that Dr. Sweetser's committee is doing has been of tremendous value. There has been a total lack of uniformity of methods by which doctors were compensated for the care of the indigent people.

In a later committee report you will find that we recommend that doctors should be paid for taking care of people who are unable to pay them. I hope that that will be the sense of the House of Delegates. If you are going to do that and accomplish anything, it will have to be done by a good deal of work on the part of the local organizations, the local societies, and these men are going to have to work together.

I am sure that if Dr. Sweetser had time he could tell you a good many experiences where the very good programs, where doctors got good compensation for their work, have gone by the board because local groups would not hang together.

There has been the question of the legality of the counties or township boards making a contract with a medical society. Mr. Brist has prepared an opinion upon which this ideal plan, we might say, or practical plan is based, which probably eliminates that question of legality.

We are prepared now, if the physicians of the state want it, to offer a uniform plan which can be backed up, as far as legality is concerned, and probably will see that the physicians get some part of what they deserve for the care of these people.

I think before we endorse this plan or take any other action, we should have a free discussion. It absolutely means dollars and cents in the pockets or out of the pockets of you men who are here tonight and the men you are representing.

Dr. W. W. Will (Bertha): One hundred per cent collection in our county.

Dr. J. P. McDowell (St. Cloud): In our county last winter we went out and overstepped the bounds of ethics, I think, in calling our Representative and Senator to the hospital and showing them what few patients we had as compared to what we ought to have. We tried to get them to fix up some sort of law whereby we could get remuneration from the state and the county to take care of those people who cannot pay their bills. They discouraged us and told us they could not do anything because they could not pass any bill that would cost the state money.

They went down to Saint Paul, and the first thing we knew they had a bill in the legislature, which Dr. Johnson properly squelched, whereby we signed away our rights never to collect anything for medical work to the poor.

However, we did arrange with the county commissioners to send our poor patients to the hospital and to pay the hospital half that the county pays. We are going to try to get Dr. Johnson and Mr. Brist to fix up a bill to be placed before the legislature as soon as it meets the next time whereby we can get the state to pay the other half to the hospital so as to keep our hospital going. As it was, we were losing patients and were having to send our nurses to some other hospital to get their training. It was an inconvenience to send patients away from home. The first thing we knew, Minneapolis was getting them all. They would get the pay patients as well as the poor.

We are willing to do emergency work during this stress of hard times and take care of these poor people who need it now, hoping that when they get some money again they will pay us for services we render later on, which I think they will. Most of them are good pay patients in Benton County, under ordinary times. But I think we have to organize some way, if this depression still remains around the county, so we can get some pay, along with the grocer, the butcher and the baker. We are getting down to where our bank accounts are in the red, and we are going to need some money ourselves, or we will have to go in the bread line with the rest. I know those fellows will take care of us when it comes to food and clothing. We live in a good county as far as agriculture is concerned, but next spring you might see the best fed, naked farmers in the county. We may be one of the best fed, naked counties at that time.

Dr. H. M. Workman (Tracy): We do not have it the way Dr. Sweetser suggested, but I think what we have is satisfactory.

We had some trouble with one doctor, not a member of our society, who was supposed to take care of all the county poor for a very small sum. I went to that fellow and told him what I thought of him. in a language he could understand. I said, "We are going to have a meeting of all the doctors in this county and I expect you to be there." He was there. The fee bill was read, and then it was discussed. We agreed to submit that fee bill to the county commissioners, stating that we would take care of all the poor in our county, that the patients select their own doctors, and we would take twenty-five per cent less than the fee bill, and they were to pay regular hospital rates. They accepted it. Sometimes we are sixty days late in getting our money but we get it, and the system is satisfactory.

Dr. J. P. McDowell (St. Cloud): I want to ask a question about that. Our county commissioners put it up to us this way: that they are not legally allowed to pay hospital bills for the care of the indigent, but they can send them down to the University for about half the hospital rate. They claim that according to their county attorney up there all they are allowed to pay us is half of what they would have to pay the University Hospital if they send them there. That is why we are hanging on the way we are.

President Pearce: Dr. Sweetser, can you give us any information on that?

Dr. T. H. Sweetser: Dr. Valentine wrote me a letter from Tracy about the way they took care of it there. Of course, they are quite a way from Minneapolis. The county is liable for half the hospital fee at the University Hospital, plus the railroad fare, plus the fare and expenses of a companion if they have to send somebody with the patient. He simply told the county commissioners that it would cost them very little, if anything, more than to send them to the University. The extras were so much; they came out just about even on that, as far as the hospital was concerned. That would not work in St. Cloud because it is so much closer.

As far as the fee bill is concerned, I know that all over the western part of the state they work it as Dr. Workman says. They charge a certain percentage of their fee bill. We mentioned the lump sum method because we felt that the county commissioners would be more willing to take the thing on if they knew where they stood at the beginning of the year. They pay the agent of the doctors, and the doctors can divide it up on a fee basis or in any way they please. I think in some counties in Iowa and Wisconsin they receive a lump sum and use it for the county society expenses. In other counties, they pay the society expense and then prorate what is left.

In Duluth they are planning a unit system wherein an office call is one unit and a house call is so many units, and an operation of one kind is so many units, and another kind of operation is so many units. Then the compensation is prorated to the doctors according to what they do. You can use the compensation just the way you please if you let the county commissioners out on a lump sum, so they know where they stand; then they can fix their budget, and you won't have friction and the chance of suits against the county.

President Pearce: Mr. Brist knows about the legal phases. I would like to ask him to tell us about them. Dr. McDowell, will you restate your question?

Dr. J. P. McDowell: The question is when the county commissioners' books are examined, and it is found they spend more money than they are allowed for anything, they are legally responsible for this extra expenditure. If sending a patient down to the University Hospital can be done for $1.80 a day, and they spend $3.60 a day in our hospital, they don't expect the examiner to pass on their books, and they feel they will be responsible for the other $1.80 a day for all these patients.

Mr. F. Manley Brist: Mr. President and Members of the House of Delegates: We went into that matter very carefully. I don't think there is much I can add to the care of the indigent, in addition to what Dr. Sweetser has said.

In respect to whether or not the county board is authorized under the law to pay for these cases at home, I think a careful reading of the statute that creates the University Hospital makes it very apparent that in establishing the University Hospital it wasn't the intention of the legislature that every indigent case should be sent to the University Hospital.

As I read the law, the intention was to create a hospital that would aid and assist the University in respect to the teaching, and I think that was the reason the legislature put in there a provision that one-half of the bill would be borne by the state of Minnesota.

I think that part of the difficulty that arises in the care of the poor is due to the fact that you have a multiplicity of legal opinions as a result of having the question submitted to eighty-seven different county attorneys. I made the suggestion that I feel the county board has the authority, the legal authority, to pay this bill. I don't think there is any question about it. I have to disagree with the learned county attorneys who have given opinions to the county board, and I know there are several county attorneys who have done that.

I made the suggestion that a meeting be had, or there be a little get-together with the Attorney-General. The Attorney-General is the legal adviser of the state of Minnesota. As far as these questions are concerned, in the absence of any express statute, unless they go to court, he has the last say. I really believe that the way to avoid all of these various conflicting opinions that county attorneys give is to have the matter taken up with the Attorney-General. I really feel that if it was properly presented to the present Attorney-General (and we have just briefly discussed this question with the new Attorney-General in line with other things) you would get a ruling on it that would be satisfactory, and one that would authorize the payment of those bills. I don't think you are going to get anywhere until the matter is finally passed on by the Attorney-General.

You must remember that the county attorneys are only human, and they want to get along with the county board and get along with the people in their own county. I think that is where the difficulty comes. The matter was presented in the legislature. The question was thoroughly ironed out. They brought it up in the committee that they had no right to pay these bills. I feel personally that the present law that was enacted at this session of the legislature, the Stearns County bill, is unconstitutional. In the first place, we all know it is a bad precedent to enact a statute that requires a doctor to donate his services. I think that is going quite a ways. I don't think it can be lawfully done. Section 3 provides that the contract made with the hospital by the county shall provide for medical and surgical attention. I don't think any hospital can lawfully contract with anybody to furnish medical service. I think that contract must be made with the doctor and cannot be made with the hospital. I think you can lawfully make a contract with the doctor, provided the doctor operates a hospital. I don't think you can lawfully reverse the situation.

We have given it a lot of time and a lot of consideration. I don't think there is any doubt about the legality of it. But you are going to continue to run into it, as I say, until somebody in authority makes a ruling. The only man I see that can straighten it out is the Attorney-General. If he will make a ruling on it (and I am sure he would, at somebody's request) and that ruling is published, these county attorneys will follow that ruling.

President Pearce: There are a number of phases to this question of keeping the patients at home. We have a University Hospital to look out for, and we have the Dean here. I would like to have his views on this matter.

Dr. R. E. Scammon: The University Hospital hospitalized 5,300 out of about 175,000 people. It is doubtful if they can hospitalize as many this next biennium as they did in the past biennium. In other words, it seems pretty obvious that the University Hospital cannot hospitalize all of the poor of the state of Minnesota, and it doesn't want to. It wants to hospitalize up to the extent of its budget, and then it is through. That is as far as it wants to go. It has no plan to develop, as I understand it, into a central agency that will try to take care of all the indigent poor. We simply could not do it. We have a limited fund. As I say, we took care of 5,300 last year. Our budget will probably go off at least 10 per cent this next year, perhaps a little bit more than that.

So far as we are concerned, if there is some way in which this thing can be adjusted, we are open to it. We don't want to be in the position that they were in in Iowa where they piled up something like 5,400 on their waiting list with nobody to take care of them. I think Mr. Brist's suggestion is a very good one. It will probably help out the counties and help us out.

President Pearce: Thank you very much.

Is there further discussion?

Dr. J. P. McDowell (St. Cloud): I was going to make a motion that this be referred to the Council to

act on, and to make suggestions, along with the Dean's statement. I wonder if there couldn't be some way whereby counties could be apportioned so many days of hospitalization for each county, according to population, so that some counties would not send all of their poor there and deprive their home doctors of all that work and deprive the home hospitals of all that hospitalization and have the other counties foot the bills.

Dr. Herman Johnson: With regard to Dr. Sweetser's report, I believe this: We want to be very, very careful about sending out any report with regard to taking care of the poor, as a model for counties to adopt. There are counties that have far better ways of handling their poor than this report brings out. Instead of just sending out the one that works where nothing else works, I think they should send out to some of those places like Tracy where they have been able to put things across, and get their plans. I hope this report does not go out in any way to make the medical profession believe that this is the real way to do it, or it is the best way to do it, because I think it is far from the best way. I think it is only a last resort affair.

I hope the report of the Reference Committee is well borne in mind that this is to interfere in no way with the local communities or the local counties that can work out their own salvation.

If you go to work and send this out, the public health workers throughout the state are going to jump right on it because they think it is going to be cheaper, they think it is going to take less money from the counties so they can get more, and so they can get the medical profession to work still cheaper than they are doing today. If you want to encourage them, I think a report of this kind is one that will help them. I suggest, therefore, that if you are going to mail out a report like that, you mail out some other reports so they have more to work on and they have more to see than what is going on right here.

There are counties that for years have paid not only the hospital bill but have paid all the way from 60 to 70 per cent of the cost of taking care of the poor. People should be given a sample of good things, not just the poorest. Let them aim high and get their county commissioners to do the very best they can for them.

I hope you will bear that in mind, gentlemen. I hope this report is made to include some of those things where we obtain better results possibly than could be done under this report.

As far as the county not being allowed to pay, I think that is all bunk. I think that is all in the head of the county attorney, because our county has paid for a good many years, and the public examiner has gone over that, as well as in other counties, and no question has been asked about it. I think that Mr. Brist's opinion, after all the experience I have had with them and after all the controversial questions he has had to pass on, still holds.

Dr. T. H. Sweetser: I want to correct a little misapprehension on this thing. In the first place, the report of the Committee on State Health Relations has not given the details of any plan, and the Committee on State Health Relations is not mailing out this plan through the state.

Dr. Johnson: Are you going to publish it?

Dr. Sweetser: The first paragraph of the report says, "The Committee has on file (available to those interested) copies of plans in operation and contemplated in this region. Opinion has been secured from Mr. F. Manley Brist as to the legality of the various plans in Minnesota.

"A plan has been evolved with his coöperation which should remove the possibility of any legal difficulties. Copies of this plan will be available to any of the local medical societies interested. Again this year your Committee offers any of the component societies its help in the establishment of such a plan."

You must have the ground-work. You must have coöperation between the doctors, and you must have good feeling with the commissioners; then you can do a lot. According to Mr. Brist's opinion, as I understand it, this plan that I stated will hold water legally, and it is apparently an improvement on any of the other plans we have. That is the reason we have drawn it up.

Dr. Johnson: I don't care so much about what you send out, if you send out more plans, but I would hate very much to see this published in Minnesota Medicine or anywhere that these public health nurses can get hold of it and shove it under your nose.

Dr. Sweetser: Dr. Wright said he was afraid this would lower the fees, and so forth. The fact is that at the present time in most counties they appoint a county physician. They haven't done that in your county. Legally they might be required, according to the law, as I understand it, to appoint a county physician for the poor. If others can put across the plans the way you have them in your county, then it will be all right. The idea is that you cannot determine anything until you try it out, by trial and error; you may find loopholes in this plan.

In most counties the county physician for the poor draws a ridiculously small salary. He cannot do all the work; he does not cover all the territory, and the other doctors take care of a large number of the indigent for nothing. Our plan is to spread the work and also spread the compensation. Dr. Wright said he was afraid it would lower the compensation. In Polk County, Wisconsin, that has not been true. After the first year the county commissioners cancelled their contract and said they would not do it any more, they would get a county physician for the poor, themselves, and take care of it. In about three months they came back to the county society and asked them to start up again. They raised the ante, and they have done it every year since, I think.

Mr. Brist: There is something here that needs clearing up. Probably I can clear it up in this fashion: When the legality of this matter was submitted to me for an opinion, I was given three plans, the so-called Iowa plan, the Polk County plan, and the plan that was proposed in Duluth. I have known for some time that other plans are in operation in this state. I thoroughly agree with Dr. Sweetser when he says that the plan in operation in Lac qui Parle County is an ideal plan, no question about it.

I am not offering any plan, I am not recommending any plan. It was not submitted to me for that purpose. If you operate under the county system of taking care of the poor, the law in Minnesota reads that the county commissioners shall appoint a county physician or physicians, and it provides that if more than one is appointed, the district in which each doctor is to serve shall be designated, and it further provides that no doctor shall be required to serve outside of his district. The word "shall" is used in reference to the county's plan.

Under the town system the law says that they *may* appoint a physician. In Redwood County some years ago, operating under the county plan, the county board made no appointment. I take it that the same is true in Lac qui Parle County; they haven't designated any county physician. They have an agreement that these people will be taken care of, and that the doctor, as I understand it, will make a charge at the specified discount off the standard fee charged in that county.

What started the difficulty was this: Dr. Sweetser or this committee had had an informal conference with a former Deputy Attorney-General of Minnesota. In his opinion he stated that he did not think it would be lawful for the county board to name more than one doctor, or if they did, they would have to specify the district. I disagree with that opinion for this reason: The law specifically provides that they shall appoint a physician or physicians. Our Supreme Court has held that where

they haven't designated a county physician, if a physician in that county takes care of a proper case, one that the county is responsible for—in other words, an indigent case—the county is liable. That case went to our Supreme Court from Redwood County, where Redwood County had failed to appoint a county physician. The Supreme Court allowed the bill. Not only that, the party in question happened to be a resident of the city of Minneapolis, and they allowed Redwood County to sue the city of Minneapolis and recover the reasonable value of that bill.

These are the only legal questions that have been presented. As to whether or not the county board can name more than one doctor, I say if they can name more than one doctor, they can name a dozen. The law does not specify the size of the district. In my opinion, there is nothing to prevent the county board from naming all the doctors in the society to take care of all the indigent in that county. I think the provision was put in there to protect the doctor, so he would not be required to go forty, sixty, or eighty miles across the county to take care of a case. I think that is why it is in there.

We must remember that the purpose of the statute is to take care of the indigent. As our Supreme Court said in another case that Dr. Robbins brought twenty-eight years ago down in Winona, the purpose and the only purpose was to take care of the indigent, and the manner in which they are taken care of is a matter of detail. It does not go into the essence of the statute. I think the plan in Lac qui Parle County is a lawful plan. I think it is a very powerful plan, because I read the gentleman's agreement they have. There is a provision in there which certainly protects the doctors, and that is to the effect that each one of these cases they take care of is presumed to be indigent. I told Dr. Johnson he should be complimented for putting that in.

Dr. Wright: I would like to say in explanation that I was not referring to his plan when I made that statement. I was only quoting the opinion of others.

Personally, I feel that every plan of this kind is a matter for each individual society to work out for itself. I do think that Dr. Sweetser's committee has attempted to lay down some rules of ethics applying to the care of the county cases. I feel that is perfectly legitimate for the State Association to do.

As far as outlining any specific plan for any county, I don't think you could apply the plan of Lac qui Parle County to Minneapolis.

The Iowa plan sets up a lump sum, you can call it an honorarium, gesture of appreciation, or what you like. Then they go to the county and say, "Here, we are using this money to bring medical educators in here and give good clinics and bring speakers, and the money goes back to the county in better medical care." There is a perfectly safe basis on which to stand.

I don't want to be quoted as advocating any particular plan because I don't know enough about it. I have heard these plans advocated. They have them in Illinois, Indiana, and elsewhere. They are all different. I think the local society, in the last analysis, has to decide what they want.

Dr. Sweetser: Every local society has to do that. The conditions are different. Our attempt was to modify these plans that were used in other states, in such a way that they would be legal in Minnesota, and we would get away from that vicious system of competitive bids.

Dr. Johnson: We will get away from that system by sticking together. That is the only way in the world that you will get away from it. Neither your plan nor any other plan will get you away from competitive bidding unless you get the local organization to stick together.

Dr. W. A. Coventry (Duluth): I move the adoption of the report.

The motion was regularly seconded.

President Pearce: I wonder if it wouldn't be wise to put in that motion that the matters which come up, that need further discussion, be referred to the Council, and they might report back to the Tuesday meeting.

Dr. Coventry: All right.

President Pearce: You have heard the motion as amended. We have no further time for discussion. All those in favor of the motion will signify by saying "aye"; opposed "no." It is carried.

The next report is that of the Editing and Publishing Committee.

REPORT OF THE EDITING AND PUBLISHING COMMITTEE

It is with justifiable pride that we report for the year 1932 on the account of Minnesota Medicine a cash surplus of $660.94, a surplus attributable in large part to economies effected through publishing a lesser number of pages in the journal each month than had been done in previous years.

During 1932 there were printed 1,156 pages, or an average of 96.3 pages per issue, thus keeping within the limit of 100 pages established at the beginning of the year. Of this number, 876 pages were devoted to reading matter and 280 pages to advertising. The reading pages included 106 scientific papers and 13 case reports, as well as editorials, reports and proceedings of various medical societies, news items, book reviews, etc. Had this material been supplied to members of the Association in book form it would have made a volume of 1,156 pages with 205 illustrations. There was an average of 17.08 illustrations for each monthly issue during this year.

In reducing the number of pages in each issue it was found necessary to discontinue certain departments in the journal, such as the Progress section containing abstracts of medical papers published in contemporary journals, and the Consultation Bureau. The arrangement of material in the section preceding the editorials was changed to allow the greatest possible number of papers being published in the number of pages available. Thus while the actual number of pages in each issue was lessened, the number of scientific papers and other material presented was not diminished to an appreciable degree. Material following the editorials has been set in more condensed type, thus allowing a larger number of words to a page. While these changes have detracted somewhat from the general appearance of the journal, it is felt that the consequent saving in expenditure has been worth while.

Whether it will be necessary to continue these economies throughout the year 1933 cannot now be definitely foretold. The precarious business conditions now prevalent must necessarily be changed before a prediction for a greater or the same surplus for 1933 can be made. Members of the State Medical Association are assured, however, that every possible effort will be made through the office of the Business Manager to make as good a showing financially for Minnesota Medicine during the coming year as was done in 1932.

At the close of 1932 our records show the number of paid membership subscriptions to be 2,056, with an added 93 journals being mailed to delinquent members, whose subscriptions were being held on the list for various reasons. There were 118 non-membership subscriptions listed, bringing in a revenue of $3.00 each. Copies distributed as exchanges, complimentary copies, through single copy sales, etc., averaged 368, leaving a surplus each month of 165 copies. This surplus is used in supplying miscarried copies, in sending sample copies to advertising prospects and to prospective non-member subscribers.

Statement of the income and expenses for the year 1932 is attached.

Very truly yours,

J. M. Armstrong, *Secretary.*

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS MINNESOTA STATE MEDICAL ASSOCIATION, PUBLISHERS, MINNESOTA MEDICINE

For Period

January 1, 1932 Through December 31, 1932

SOURCE OF CASH RECEIPTS

Display Advertising		$ 7,344.88
Illustrations		84.99
Member Subscriptions		4,204.00
Non-member Subscriptions		407.97
Bad Accounts Recovered		36.42
Dividend on Advertising from American Medical Association		291.84
Gross Cash Receipts		$12,370.10
Less:		
Discount and Commissions		
Advertising	956.74	
Subscriptions	8.56	965.30
Total Net Cash Receipts		$11,404.80

CASH DISBURSEMENTS

Journal Expense	$10,743.86
Cash Surplus for Period	$ 660.94
Accounts Receivable December 31, 1931	$ 1,226.33
Accounts Receivable December 31, 1932	886.87

PRESIDENT PEARCE: Is Dr. Armstrong here? (Absent) Is there any other member of the Editing and Publishing Committee that wishes to make any comments on their report? (None)

Reference Committee, have you any comments on the report of the Editing and Publishing Committee's report?

DR. F. H. MAGNEY: The committee commends the report of the Editing and Publishing Committee, and particularly that feature of it which shows the adoption of an economic policy which permitted a favorable balance within the past year.

We would, however, call attention again to the fact that it would be well to devote more space and effort to the consideration of live economic problems in which every member of our Association is actively interested. This would, in a measure, also answer the problem raised by Dr. Will in his Councilor's report as to how the non-attending members of the Association could be informed as to the economic problems now confronting us.

This is particularly desirable since according to statistics of the A. M. A., over 40 per cent of the members in Minnesota do not subscribe to the *Journal of the American Medical Association.*

We recommend the adoption of this report.

PRESIDENT PEARCE: You have heard the recommendation of the Reference Committee. That is an important thing because there has been considerable difference of opinion as to how much of our State Medical Journal should be devoted to economic problems, how much space should be devoted to economics, and how much should be devoted to science. I am sure that the Editing and Publishing Committee will be very glad to have the House of Delegates act on the recommendation of the Reference Committee.

As I understand, the Reference Committee are advocating that more space in MINNESOTA MEDICINE be devoted to publishing matters of economics. Is there any discussion on this report? If there isn't, the Chair declares that it is the sense of the House of Delegates that this recommendation of the Reference Committee be accepted.

DR. W. F. BRAASCH (Rochester): I am a member of the Reference Committee. I would like to know how some teeth can be put in that recommendation, because a similar suggestion has been made year after year. I really think the scientific qualities of MINNESOTA MEDICINE are above reproach; nevertheless I think some member of the Editorial Committee should be here tonight to listen to this resolution because it certainly should be done.

As I said before, I wish I knew some way whereby teeth could be put into the resolution so they would devote more space to economics. The members of the Association are interested in economics, and the more they can hear about it and the more they can read about it, the more good they will get out of it.

PRESIDENT PEARCE: Dr. Hamilton, you are a member of this Committee. Have you any comments to make?

DR. A. S. HAMILTON: Without putting further teeth into the matter, I think I can promise that more attention will be paid to the matter of economics.

PRESIDENT PEARCE: Is there any further discussion? If there is no further discussion I will declare it is the sense of the House of Delegates that the recommendation of the Reference Committee be accepted.

Dr. Meyerding has asked me to ask the Credentials Committee if they have any more credentials from the Delegates at this time.

DR. C. A. MCKINLAY (Minneapolis): We have two more.

PRESIDENT PEARCE: The next is the report of the Editorial Association Committee by Dr. Reynolds. Is there any other member of the Editorial Association Committee here? (No)

REPORT OF EDITORIAL ASSOCIATION COMMITTEE

Due to the fact that the editorial association's activities were well organized last year and no requests have come from the editors throughout the state, the committee has not found it necessary to meet.

Respectfully yours,

JAMES S. REYNOLDS, *Chairman.*

Dr. Magney, have you anything from the Reference Committee?

DR. F. H. MAGNEY: Nothing special except that the Reference Committee recommends that the report be accepted.

PRESIDENT PEARCE: Is there any discussion on the report of the Editorial Association Committee? If not, the Chair declares it is the sense of the House of Delegates that this report be accepted.

The next order of business is the report of the Radio Committee.

REPORT OF THE RADIO COMMITTEE

The fifth "air birthday" of the Minnesota State Medical Association Morning Health Service from Station WCCO was observed April 5, 1933. For the past five years, your Radio Committee has sponsored a weekly health broadcast. All the talks were prepared and delivered by William A. O'Brien, M.D., University of Minnesota, with the exception of five when he was unable to be present and they were read by a substitute. Our service is now the oldest, non-commercial, sustaining feature from Station WCCO. Surveys indicate it has developed into one of the most popular local broadcasts with a constantly growing audience.

A long and intensely interesting survey of activities since 1928 has been prepared by the committee. It covers methods of preparation for broadcasts, estimates of the constantly growing audience and lists subjects for the five years. An account of the "by-products" in the way of talks by the radio speaker requested by all types of groups, with specimen talks as they have been mimeographed and distributed through the courtesy of the Citizen's Aid Society, is also included. This survey is in the hands of the secretary. Interested persons are urged to ask for it and read it in full.

The following brief recommendations are quoted from the conclusion:

RECOMMENDATIONS

1. From April 4, 1928, to April 5, 1933, your committee sponsored 265 radio health talks. The original con-

tention "of the necessity for such a service" has been proven and we recommend that it be continued.

2. The daytime period (11:15-11:30 A. M., Wednesday) is most effective in reaching women. Our original objective was "to have the representative of the State Medical Association make a friendly call once a week in every home where there is a radio set, to discuss problems of the family health with the wife and mother on whom chiefly rests the burden of keeping the household well." Recommend the same time.

3. While a variety of subjects can be used in an audience as large as ours, effective program building is probably our greatest problem. The assistance of all our members is earnestly requested and we wish to acknowledge all the help we have received in the past.

4. The attention of special committees is called to the service we can render in helping them make their educational programs more effective.

5. Although the radio has been discussed as a method of graduate education for physicians, your Committee believes that more physicians should listen to the broadcasts for another reason. Our chief function is to arouse interest; the medical profession must do the rest. A coöperative message is most effective.

6. Many suggestions that the talks be printed in local medical journals have been received from physicians who find it impossible to listen but who do desire to coöperate.

7. A total possible audience of 2,850,000 is served by Station WCCO. Our program is said to reach a considerable number, estimated at 20 to 30 per cent. For this reason, we suggest continuing our program from Station WCCO which apparently has most effective coverage.

8. Excellent publicity has been obtained. More effective local publicity can be developed by county medical organizations, coöperating with the headquarters of the Minnesota State Medical Association.

9. Your Committee wishes to thank the officers of the Minnesota Public Health Association and the editor of *Everybody's Health* for publishing abstracts of the radio talks.

10. Our mail has been unusually large. A recent test showed one of the largest mails ever received by a non-commercial broadcast. The approximate cost of such a service is about five cents a copy (less if certain economies were practised). A budget of $250.00 a year would probably cover the cost. We wish to thank the Citizen's Aid Society of Minneapolis for financing the mail test. The question of copies should be discussed.

11. Our radio speaker makes many personal appearances, many as the result of the radio health talks. In 1932, 102 personal appearances were made before 20,000 people. This is a desirable addition to our Radio Health Service and we recommend that it be continued.

12. Self-medication is a national health problem as much of it is potentially harmful. The better radio stations and newspapers are now carrying more medical advertising, probably as the result of economic pressure. Every physician should constitute himself a committee of one to correct harmful statements. Signed communications based on facts are desired. The necessity of continuing our educational efforts through the same channel is obvious if we desire to present the other side of the question.

13. We recommend that Station WCCO be thanked for their service and coöperation so generously given during the past five years without charge to the Minnesota State Medical Association.

STANLEY R. MAXEINER, M.D., *Chairman.*

Dr. Maxeiner is chairman of that committee. (Absent)

PRESIDENT PEARCE: Is there any member of the Radio Committee present who would like to make any remarks on the report? (No) If not, we will call on the Reference Committee for their recommendation.

DR. F. H. MAGNEY: The committee commends the very excellent work being done and appreciates the services of Dr. O'Brien in broadcasting, and recommends that the secretary of the State Medical Association send a letter expressing thanks to the Citizens' Aid Society of Minneapolis which financed the mail test, and also a letter of thanks to Station WCCO for their coöperation so generously given for the past five years without charge.

The committee recommends that placards be prepared that can be posted in the physicians' reception rooms calling attention to the day and hour of these radio talks.

PRESIDENT PEARCE: Is there any discussion of this report? Dr. Coventry made some remarks about this report.

Would you like to speak at this time?

DR. W. H. COVENTRY: We have a broadcasting station in our town that cannot be heard in Minneapolis, and I will return the compliment and say that we cannot hear Minneapolis during the day time. I hope some method will be devised whereby, through our society, we may be able to broadcast Dr. O'Brien's talks over our local radio station.

PRESIDENT PEARCE: Is there any further discussion? If there is no objection, we will declare that the report of the committee as read, with the recommendations, are the sense of the House of Delegates and are accepted.

Dr. Meyerding has worked very strenuously for the last several months in selling space to commercial exhibitors for this meeting, and he wishes me to urge upon the House of Delegates, and they in turn to urge upon the other members of the society with whom they come in contact, that they visit these commercial exhibits. Also to keep in mind, when you are going to purchase something, that we should patronize those people who patronize us.

The next report is that of the Historical Committee, by Dr. Hamilton.

Dr. A. S. Hamilton read the report of the Historical Committee.

REPORT OF HISTORICAL COMMITTEE

Last year your committee reported progress on the Medical History and expected to be able to have ready for this meeting, the first volume of the history but the financial depression has been so great that the committee felt it would be impossible to sell any reasonable subscription list and we recommend, therefore, that the work on the history be continued and its publication be postponed for another year (I might say until a better time).

Our budget for the period January 1, 1932, to December 31, 1932, was $750.00, and of this sum we spent $233.62, principally for the preparation of manuscript. The amount left in the budget at the end of the year, $516.38, was charged into surplus.

For the year January 1, 1933, to December 31, 1933, our budget was again $750.00. Our expenditures to date are $188.83, leaving a balance of $561.17 for the remainder of the current year.

A. S. HAMILTON, M.D., *Chairman.*

DR. HAMILTON: It is obvious that our expenditure column is increasing, but the history is now in such shape that we have had to employ competent stenographers to get it ready for publication.

DR. F. H. MAGNEY: We recommend that the report of the Historical Committee be accepted.

PRESIDENT PEARCE: Is there any discussion of this report? I want to say that getting up the history of this organization is a tremendous job. No one realizes how much work is entailed in doing it until you have had an opportunity to talk to Dr. Hamilton or some other member of the committee and see the material that we have had to go over. The hardest thing about this whole job is that the stuff should have been assembled seventy-five years ago instead of at this time.

A lot of the records of this society cannot be found anywhere, that is, the early records.

The committee has done a wonderful job. I have had the opportunity of reading a great deal of the first volume. It relates to what our ancestors and the founders of this society were doing.

I can say that sixty years ago tonight, or sixty years ago at the time of the annual meeting, which was held in February, they were discussing the same thing we are discussing here tonight. In the transactions of this society sixty-five years ago you will even find the same resolutions that we are passing here tonight. Does that mean anything to you? It means a lot to me. It means that while we are a fine, deliberate body, we don't get much action, and we have to speed up the efficiency of the economic side of this organization. There is no use of our sitting here and having committees working and spending their time and their effort, if we do not develop the machinery to put some of these things into action.

I want to commend the Historical Committee for the work they are doing. I want to assure you that you have a big treat when that volume comes out, or when those volumes come out, because it is full of very interesting material. You could find nothing more interesting to read than the ideas of these gentlemen of sixty-five, seventy and eighty years ago on the treatment of disease and the deductions they made from their observations about epidemics and so forth, with no knowledge whatever of germs or the actual cause of disease. But they were very keen observers. If I had time, I would like to tell you some of the things that Dr. Hamilton has in the history.

The next is the report of the Committee on Hospitals and Medical Education, Dr. Samuel Solhaug. (Absent).

REPORT OF COMMITTEE ON HOSPITALS AND MEDICAL EDUCATION

In reply to your request for an annual report from the Committee of Hospitals and Medical Education, allow me to state that the present committee has been in force less than three months.

Let me say further, that while no active move has been made by the present committee, the work of revising the booklet of information on postgraduate courses for practising physicians is well under way and should be available to the members of the medical profession by the first of May.

SAMUEL B. SOLHAUG, *Chairman.*

PRESIDENT PEARCE: Is there any other member of that committee who would like to make any comments? If not, I will ask Dr. Magney to report for the Reference Committee.

DR. F. H. MAGNEY: The committee recommends the adoption of this report without any comments.

PRESIDENT PEARCE: Is there any discussion? If there is no discussion on this report, we will consider that it is the sense of the House of Delegates that it be accepted.

The next is the report of the Heart Committee, Dr. Hirschboeck. (Absent)

REPORT ON HEART COMMITTEE

The activities of the Heart Committee of the Minnesota Heart Association for the past year, under the chairmanship of Dr. Harold Richardson of Saint Paul were carried on as actively as was thought consistent with the best interests of the Minnesota State Medical Association.

Weekly talks were given over the radio through the courtesy of Dr. W. A. O'Brien and the facilities of WCCO radio station.

Plans were suggested for the promotion of extension courses for the physicians in the State on the general subject of heart disease, but each one of various proposals was finally rejected as being impracticable, presently. The names of several lectures on cardiologic subjects were given to the secretaries of the various component district societies, offering the participation of certain enrolled lecturers for county society meetings. There was, however, no response and no calls for speakers. There has been no further effort made to elicit the interest of the county societies, but the facilities are still available when desired.

A meeting of the new Heart Committee for 1933-34 was held at the time of the annual conference of secretaries in Saint Paul on February 18, 1933. It was the consensus of opinion that one of the most useful functions the Heart Committee could perform would be to serve in a liaison capacity between the American Heart Association and the Minnesota State Medical Association. The plans of the former in promoting the centralization of interest in heart work in the State would be appraised, and whatever might prove of advantage suggested to the State association. We do not feel that the present time is one in which the organization should be encouraged to take too active a part in social welfare activities as applied to heart disease.

It is the intention of the committee to promote interest in cardiologic study among the practitioners of the State and to watch carefully for any possible encroachment by any lay organization of privileges which belong to the individual physician. With this understanding the committee is willing and desirous of continuing its work, and we feel that though of negative value, it will be to the interests of the State Medical Association to allow them to continue their function.

F. J. HIRSCHBOECK, *Chairman.*

PRESIDENT PEARCE: Is there any other member of the Heart Committee who would like to make any comments on the report of that Committee? (No)

Dr. Magney, will you report for the Reference Committee?

DR. F. H. MAGNEY: We recommend the acceptance of this report.

PRESIDENT PEARCE: Is there any discussion of the report? You have all had a copy of it. If there is no discussion, we will consider that it is the sense of the meeting that the report be accepted.

The next is the report of the Committee on Public Policy and Legislation by Dr. Herman Johnson.

REPORT OF THE COMMITTEE ON PUBLIC POLICY AND LEGISLATION

The committee submits the following report:

The Naturopathic Bill was killed on the floor of the Senate. We opposed three chiropractic bills; one was very vicious, and would have exempted the chiropractors from the Basic Science Law. After several hearings, it was recommended not to pass by the Public Health Committees of both the Senate and the House. However, minority reports were brought out in both places, but they were fought out and killed on the floor of both Houses.

The other two chiropractic bills had to do with their Board, and would have increased their license fees $10 per year, and permitted them to use their funds for educational purposes, which we take to mean propaganda and advertising. We were never accorded a hearing on these two bills, and were informed that they were killed in Executive Session. But, just as an illustration of what happens, these bills were revived and brought into the House under suspension of rules, amended on the floor, and passed with a large majority. Our friends voted for them, not knowing what they were doing. However, they were caught in the Senate, and there killed.

Both the Massage and Optometry Bills failed to pass.

The Garnishment Bill, which first provided an exemption of $75.00 and $10.00 for each dependent, was finally amended to allow an exemption of $35.00 and $5.00 for each of three dependents. The bill as introduced

was unreasonable, as many people do not make as much, at the present time, as the exemptions that were allowed.

The auto drivers' license law was passed, also the financial responsibility law which, in course of time, should be a protection to the public and make it easier for hospitals and doctors to get paid for services in auto accident cases.

In reference to the Hospital Lien Law, it is our opinion that the hospital should have been a prior lien, or at least a lien of equal grade with that of the attorney. It is possible that the value of this lien law as passed may be over-estimated, if the reports from places where it is in effect are correct. It was within the province of the legislature to have given the hospital lien prior or equal rank with that of the attorney, and we feel that it should have been done.

The Wadena County Hospital Bill was generally opposed, especially by the large cities delegation, University of Minnesota, etc., for the reason that the bill as introduced would have permitted the hospitalization of indigent cases in Wadena County, with one-half of the expense to be paid by the other eighty-six counties. The bill was killed.

A similar bill was introduced from Stearns County having the same provision as to half the expense being borne by all the other counties; this was also killed. In the last days of the session another bill was introduced limiting this to Stearns County and without this provision. It is all right for medical men to donate their services in worthy cases, if they so desire, but we do not think it is necessary to pass a law requiring them to do so. On this last bill no hearings were held. It was passed under suspension of rules the last day. There is, however, a question as to its constitutionality. The time has not come for the medical profession groups to approve of a legal restriction as to fees and compensation for their services. Any medical men who do so jeopardize the rights of the organized group as a whole.

During the legislative session the Legislative Committee, the president, various members of the Council, and the insurance committee appointed by the president have met with adjustors from the insurance companies at various times. At these meetings the problems of the doctors as well as the insurance companies have been thoroughly aired, and we feel that these meetings were of a great deal of benefit to us all. A tentative plan was worked out, if it is approved by the Council and the House of Delegates, whereby a committee of the State Medical Association and a committee representing the insurance companies will act in trying to iron out difficulties and misunderstandings that may arise on either side.

This committee would also secure statistics as to what insurance companies and what lawyers settle cases without paying the hospitals and doctors, and such other information as they considered of value. The necessity for some coöperative action along this line is quite apparent, as there has been a move on foot during the winter to put compensation under state insurance. While this move did not get any real start this year, it is one of the things that is likely to be attempted next session. We do not believe that this would be to the best interests of the public, of labor, or the medical profession.

The following are just some suggestions for you to study and think over for the future, as they are problems that we are actually facing. They will grow more urgent as time goes on, and possibly may have to be corrected through legislation. One is regulation of the practice of physiotherapy by independent and, at the present time, unlicensed operators. Another concerns the nursing profession, some members of whom are making diagnoses and, in a sense, indirectly practicing medicine.

Possibly some change should be made in the medical practice act so as to leave it to the discretion of the medical board as to what constitutes dishonest and unprofessional conduct, having in mind that the Board would take into consideration the ethics of medical practice. The Board also should have power to suspend a license and to reinstate a license. At the present time the Board can revoke a license, only. This would give the Board more disciplinary power, a revocation is seldom resorted to except in extreme cases, while suspension for a moderate period of time would be quite effective and would more often be resorted to. It is believed that if such changes could be effected, that some of these unethical doctors setting themselves up as unusual specialists, and advertising in circulars, telephone directories, and office windows, could be controlled.

While things have not, from a practical standpoint, changed a great deal, yet there is every evidence and reason to believe that by next fall the effect of inflation will be felt and prosperity will be on the road. We may have our ups and downs, yet we feel we can look forward to general prosperity all over the country within a period of a year or less. Therefore we feel that this is the time to sit tight and protect what we have, until we see what happens. We suggest that this is no time for us, or other affiliated organizations, to jump into and try out any new, possibly ill-considered, schemes, no matter from whom such suggestions may come. If we do, we are likely to regret it in the future.

Respectfully submitted,
H. M. Johnson, M.D., *Chairman.*

Dr. Herman Johnson: I know you all have the report, and you have read it. It is pretty short as you know the Legislative Committee cannot tell you everything they know or everything they have done.

Our committee has developed in so many different channels that we don't know where it is going to land. Among other things, it has become an information bureau, and not only along medical lines. Legislators come to us for information of all kinds. They are looking for reliable information all the time.

I should probably explain some of the aspects of interest to us on the Hospital Lien Law passed at the last session of the legislature. Following several meetings with insurance adjusters and hospital people, it was decided that the hospital people should make an attempt to get such a law for them alone as it would be easier to put across if we were not tagged to them. For our part, we decided to try a sort of gentleman's agreement with the insurance companies for the next two years. If we can't make things go on that basis, then we will probably try some legislation of our own. If the Hospital Lien bill had passed as it was introduced, it would have been a very good bill and it would have been very easy to amend to include medical and nursing care later.

Here is what happened to it, however. It got stuck in the Senate Judiciary Committee. They came to us for help, which we gave them. Later, they informed us that the lawyers wanted a prior lien. We told them that would spoil the bill and that they should not let them do it. We heard nothing further, and supposed things were going smoothly until, the first thing we knew, the House passed the bill with the amendment giving the lawyers the prior lien. There are thirty lawyers in the Senate. They saw to it that the bill was passed with the amendment. When we found out about the House action, the bill was already in the Senate and going up on special order. We did what we could to change it. Dr. McDowell and Dr. Lewis came down from St. Cloud and it took just a short time to straighten things out so far as eliminating the amendment was concerned. If the hospitals had not had the House bill substituted for the Senate bill, the Senate bill could have gone through, the differences between it and the House bill would have been ironed out, in conference, everything would have been all right, and

a good bill could easily have been passed by the Hospital Association; as passed, it is probably of little practical value.

We placed confidence in this case, where we should not have placed it. They had a doctor on the Hospital Committee and we had full confidence he would look out for any changes in the bill. But the lawyer's priority lien was taken on without his knowledge and he was chairman of the committee. You see how things happen.

You might be interested in the Wadena bill. That was a bill which was introduced by a doctor up there without the knowledge of the medical profession, the Councilors, or anybody else. It provided that Wadena County should have the opportunity to take care of their poor and be reimbursed by the rest of the state, in the same manner as the University Hospital is reimbursed. Furthermore, the cost of railroad transportation would be the amount paid for medical and surgical care. In Wadena County, transportation might amount to a little, but in counties close to Minneapolis or Saint Paul, fifty miles away, the money left for doing an appendicitis operation might be about $3. We objected to it. The University came over there and did business, and the bill did not pass.

The St. Cloud bill was a different matter. The doctors, there, were not mixed up in it at all although the representatives told us they were. In this bill it was specified that the doctors should give their services for the poor for nothing and also that the state should pay half the cost of the care of the poor as to hospital care. We told them that they should not specify anything like that in the law. This first bill was killed because of its demand that the state pay half of the hospital bill.

At the very last moment, however, another St. Cloud bill was introduced into the Senate in the forenoon and passed in the afternoon. It was passed undersuspension of rules in the House and never got into any committee that we were able to locate. There was no chance to get it. This bill was amended so that the state should not have to pay for care of the poor up in that county. It does provide that the medical profession of St. Cloud shall take care of the poor for nothing. Mr. Brist says that this law is unconstitutional. I think the resolution that the Council introduced tonight, whereby all legislation pertaining to the medical legislation should first be brought up before the Council, is a very good one, and it should be enforced.

In the Wadena case we did not know what to do, but we tried to do what was right for the whole profession of the state. The Legislative Committee, members of the Council and various other doctors, the president of the Association and chairmen of various committees, met with the adjusters of the most reliable and, I presume, the best insurance companies in the state. We had various meetings. We had dinners, and so on, because that is the only way you can get together. The insurance companies would get up and eat us up, and then we would eat up the insurance companies. When we were all through and had said all the bad things we could say about one another, we began to see that all of us had faults, and we came to a better understanding. I think it is absolutely essential for the medical profession to have a better understanding with the insurance companies, because, after all, the better companies want to do what is right. We should have a committee to deal with some of these insurance matters. Then if some of these insurance companies try to do things that are not right, they would be called on the carpet and will have to explain themselves. When they charge some of our profession with gross negligence and overcharging, those complaints, too, will have to be aired out. This committee, of course, should have no arbitrary power. It should try to iron out things in the best way for all concerned.

If the House of Delegates sees fit to pass resolutions whereby a committee of the association may meet and negotiate with the various insurance adjusters, we may be able to arrange our difficulties. At least, we can get full information about the lawyers and insurance companies who are settling without consulting doctors and hospitals. We will be in a position, then, to talk direct to those who do not pay.

One suggestion has been made in regard to physiotherapists. Physiotherapists should be under some regulation. At least they should be under the Medical Board. When the time comes that the House of Delegates and the Council think it necessary to have some such regulation, a study of the laws in other states should be made, so we may know better from their experience what kind of law should be passed. Another suggestion concerns some of these public health nurses. I like them all right; they are good looking and fine. At the same time, they are always looking out for themselves. I think Dr. Sweetser's committee has done a lot of good work. But, you know those public health nurses smell things. They are always looking for ways to get work done cheaper by the medical profession and they are ready to take credit for all the charity work done by the medical profession while they themselves are well paid. You cannot make any arrangements and hold them to it. As a rule you have to have your hands on their necks all the time. They told me about the Iowa plan. They knew every plan that had ever been devised. I said, "Isn't this plan, after all, going to take the money away from us?" They said, "Yes." I said, "That is something for you to run around with. Who is paying you? I am paying taxes. You are my servant, and you are trying to do away with my income. When you begin to be cut as much as we have, then, maybe, we will be able to talk business." They told me we were getting too much for tonsil operations, even at our discount, and they mentioned St. Cloud as an example.

The public health nurse knows about the Iowa plan and every other plan whereby they get away from paying out any money to the doctors. We have to keep them where they belong, otherwise they will get away with us and run us. Furthermore, there are complaints at various places about some of these public health nurses practicing medicine. They look at a child's throat, and say, "You have to have your tonsils taken out" or, "You will have this and that." Then some school nurse says, "You have to go home, you have scarlet fever." Another one says, "You have measles."

After all, the nurses have no right to make diagnoses. Instead of sending the children home, they should refer them to the family physician or see that he is called. I do not think that any special law should be passed. But possibly, if they keep on, it would be all right for the Medical Board to pass a regulation and tell them that they are not doctors or permitted in any way to diagnose and recommend, which constitutes the practice of medicine.

They have learned, however, that they cannot get along without the medical profession. Public health and county nurses are looking out for one thing. That is, to see that they, themselves, get good pay, and that the doctors work for nothing. I think that is their chief ambition in life.

Now about the Medical Board. The law as it is now is an old law. It has only been changed by amendment, Mr. Brist tells me, since 1887, and that is a long time. There was a time when it would have been impossible even to think of what we suggest here. That is, that it be left to the Medical Board to define violations of medical ethics. When we first began to interest ourselves in legislation, somebody would be sure to say, "Oh the Trust." If somebody won't step the way your trust wants them to step, you squeeze them out. However, the bar association has found that they can have their Board of Examiners define the ethics of their profession. I think in the course of time the legislature

would be willing to entrust the matter of defining medical ethics to the Medical Board, because the medical profession, when everything is said and done, is gaining the respect of the public through our educational efforts, through meeting with us in various ways. Eventually, I think something can be done.

As the law is now, the Board can revoke a license only. That is hard to do. You take a man as old as I am. If I went pretty much wrong, or any of the rest of you did, they would hesitate to revoke our licenses. I would expect that of them, and I would do the same if I were on the Board. If the Board could suspend it for three months or six months, I think their power could be used more often. Of course, they would still have the right to revoke. The Medical Board has done well as it is, and their attorney has done well. But we should have some means of bringing to task these men who are advertising themselves as great specialists, and are nothing but quacks. There are medical institutes of various kinds, as you know, that are nothing but fakes and grafters. If the law was changed so that the Board could be the judge of medical ethics, such quackery would not long exist to prey upon the innocent public, and at the same time cause a disrespect for medicine, and much of their undesirable publicity could be prevented.

The Legislative Committee met at least a dozen times during the session. At most of these meetings the whole committee was present, and many matters outside of those mentioned were discussed thoroughly. I surely appreciate the active interest, the work they did during the winter, and the splendid coöperation at all times of the members of the committee, namely—G. I. Badeux, M.D., Brainerd; L. A. Barney, M.D., Duluth; E. A. Eberlin, M.D., Glenwood; W. A. Fansler, M.D., Minneapolis; J. M. Hayes, M.D., Minneapolis; M. O. Oppegaard, M.D., Crookston; F. J. Plondke, M.D., Saint Paul; C. B. Wright, M.D., Minneapolis; and their splendid coöperation at all times.

In closing, I just want to say that I feel that things are getting better. We should not undertake anything that we might be sorry for afterwards. It is very easy to put into effect a plan whereby you can take care of people for next to nothing, but it is very difficult to get away from it. If such a plan goes into effect in one place, it will be set up as an example all over the state. Then they will want us all to work for nothing. I know we are all working too cheap now. At the same time, we are used to it. We seem to thrive on it as most of us are fleshy and healthy, so I guess we all must have had plenty to eat.

Dr. F. H. Magney: Although there may not have been many new measures passed at the recent session of the legislature which are outstanding, nevertheless a large amount of constructive progress has been made that will be of greatest value to the medical profession.

The work embodied in the report is probably of greater importance to the members of the Association than that accomplished by any previous legislative session.

The work of the Legislative Committee merits the endorsement and the approval of all members of the Association.

"We would call attention to the recommendation that the modification of the Medical Practice Act should be made which would give the Board of Medical Examiners the power to suspend a license and reinstate it at their discretion.

The Reference Committee endorses the work of the Committee on Public Policy and Legislation.

President Pearce: You have heard the report of the chairman of the Legislative Committee and also the report of the Reference Committee. There is one direct recommendation that I think it would be wise for the House of Delegates either to refer to the Council or take direct action themselves. That is the recommendation regarding the State Board of Medical Examiners. I would like to open this report for discussion.

Dr. R. E. Scammon: Dr. Johnson has told you of the multitudinous activities and duties of this committee. Among others, there is the matter of medical education. I had the pleasure of meeting informally with this committee. I met with them at six o'clock and I left them at one. If there was a sore spot in the medical school that we did not go over, I don't know what it was. They found them all. They are more than diagnosticians; they are psychoanalysts. I think we were in practically perfect agreement about the situation. I think they protected your interests with respect to the medical school, and it is proper that they should protect your interests. I think it is possible that the medical school may work to the disadvantage of the profession. Its purpose is to work with the profession. I feel they did exactly the proper thing in going over our records from A to Z, and, as I said before, they went to ZZ.

After having done that, they supported the medical school. They supported it in its hospital request. They supported it in its research funds. They studied the research funds to the limit. In my opinion, the great thing that enabled us to secure the support that we needed to continue that institution was due largely to this committee. Personally, I want to express my thanks, and I know I am expressing the thanks of those who are connected with the medical school, for their very kind and just services in connection with the last legislative session.

President Pearce: Is there any other discussion on the Legislative Committee's report?

Dr. O. J. Hagen (Moorhead): May I say a word of appreciation for this committee as far as the University is concerned. When Dr. Scammon tells the story of how they got together at six o'clock in the evening and stayed until one o'clock in the morning, it simply shows what contacts can do in seeing all sides of the question. There are many controversies that arise in the medical profession, and they are practically all due to misunderstandings. In all these questions, when we don't understand each other, we get into controversy, and we break a great program just because of that misunderstanding.

I was happy to know they met long enough, until one o'clock in the morning, to get together and understand each other. It reminds me of the story of that great Egyptian queen, Cleopatra, who traveled up the Nile. Mark Antony got on her boat as it was floating down the Nile. They were strangers, in a way. He was a great warrior and she was a very fine sweet lady, as we understand her to be. Do you know that they came to an understanding? When she dismissed him at four o'clock in the morning, she said, "Tony, I'm glad you have been here."

Dr. R. E. Scammon: I have been compared with Old Bill but have never been compared with Cleopatra.

President Pearce: Is there any discussion on the report of Dr. Johnson?

We have had the expression of opinion from Dr. Magney who is the youngest appointee on the State Board of Medical Examiners, but I see we have two or three more of the State Board of Medical Examiners. I see Dr. Sivertsen sitting back here.

Have you any comments to make on this proposed change in the laws governing the State Board of Medical Examiners?

Dr. Ivar Sivertsen (Minneapolis): No. I think something could be done. I think the Board will give it close attention.

President Pearce: Dr. Adson.

Dr. A. W. Adson (Rochester): I think the ruling with reference to suspension would be very valuable in handling some of the problems that come up, particularly narcotic addicts among physicians.

At the present time we work out an agreement

whereby the individual will agree not to practice medicine for three months or six months, while he is attempting to recover from his addiction. If we had some ruling by which he could be suspended, a lot of embarrassment could be avoided. At the present time we cannot revoke a license and then expect to reinstate him without examination. Therefore, we are naturally very lenient in revoking licenses.

PRESIDENT PEARCE: Are there any further remarks? I would like to entertain a motion that this recommendation of the Reference Committee in regard to the Board of Medical Examiners be referred to the Council so that we can get it in shape to pass it along for action.

DR. A. W. ADSON: I would like to so move.

The motion was regularly seconded.

PRESIDENT PEARCE: You have heard the motion. Is there any discussion? All in favor signify by saying "aye"; opposed. It is carried.

I take it that it is the sense of the House of Delegates, if there is no objection, that the report of Dr. Johnson's committee is accepted.

The next order of business is the report of the Committee on Medico-Legal Affairs. Dr. Hengstler.

REPORT OF COMMITTEE ON MEDICO-LEGAL AFFAIRS

The Committee on Medico-Legal Affairs has not held any definite meeting during the past year, as there has been no occasion for such a meeting. The chairman of this committee has been present at the meetings of officers and committee-chairmen, which have been held at the call of the president of the Minnesota State Medical Association. The chairman of this committee also attended the Secretaries' Conference at the Hotel Lowry, in Saint Paul, in February, 1933, and at the invitation of the secretary of the Minnesota State Medical Association, spoke briefly, from the standpoint of the Medico-Legal Affairs Committee, upon subjects that were under discussion at this conference.

On August 26, 1932, there was submitted to the chairman of this committee, for criticism, a questionnaire received from the American Medical Association, which was examined and returned to the secretary of the Minnesota State Medical Association, with no particular comment.

With reference to that portion of our last year's report, which dealt with changes in the present law regarding the discharge of criminally insane from state institutions, and with reference to suggestions in previous reports concerning constructive legislation in Minnesota in the matter of expert testimony in criminal cases, nothing further has been done. It was thought inadvisable by the chairman of this committee to undertake anything along legislative lines at this particular time.

The chairman of this committee desires, in this report, to recommend that each county society in the State of Minnesota appoint or designate a committee to be known as "The Committee on Medico-Legal Affairs" or "The Committee on Malpractice." In the event that it is not advisable in all societies to appoint a new committee, it is suggested that one of the existing committees be empowered to handle medico-legal and malpractice affairs. It is our feeling that with the prevalent danger of malpractice suits, distinct benefit can be obtained to both the individual physician being sued, to the county society to which he belongs, and to the insurance company defending him, if a committee from the society is empowered to act in an advisory capacity, in the event that suit is instituted against one of its members. Furthermore, if county societies will adopt this suggestion, it will provide for a uniform handling of malpractice suits and other medico-legal matters throughout the component parts of the Minnesota State Medical Association. If the House of Delegates sees fit to adopt this suggestion and it is put into operation, it is suggested that the names of the members of each society serving in this capacity be kept on file with the Secretary of the Minnesota State Medical Association, in order that the state Committee on Medico-Legal Affairs may establish contact with any local Committee that they desire, at any time, should it be necessary.

The chairman of this committee also believes that some definite policy should be adopted by the House of Delegates with respect to physicians' fees for expert testimony and expert service in mal-practice suits. At the present time some confusion exists among the profession and among the insurance companies as to whether or not a fee should be charged by physicians rendering expert service or expert testimony in malpractice suits. It is believed advisable that the House of Delegates consider this matter and adopt a definite policy which shall be state-wide, and to which physicians of the Minnesota State Medical Association shall subscribe in rendering expert service or expert testimony in malpractice cases. The establishment of a uniform understanding among the physicians of this state, as to how they shall govern themselves in charging for court service in malpractice suits, will assist greatly in clarifying the present state of confusion which exists in regard to this particular thing. No recommendation is offered here as to whether this service should be rendered gratis or whether regular expert fees should be charged, or whether a certain percentage of regular expert fees should be charged, but the recommendation is offered here that the House of Delegates give this matter consideration and take some action along this line.

It must be definitely understood that the suggestion offered in the preceding paragraph applies only to expert service in *malpractice suits* and has no reference whatsoever to the ordinary expert service or expert testimony given by physicians in personal injury or other suits which are not for malpractice.

One other matter has come before this committee during the past year, having been referred to us March 29, 1933. This matter is still in committee and relates to the effort of one member of the Minnesota State Medical Association to establish contract private practice in his community. At the time this report is written, the matter is still in committee, and has not yet been acted upon, but prior to the meeting of the House of Delegates our report will be in the hands of the secretary of the State Medical Association.

Respectfully submitted,

W. H. HENGSTLER, *Chairman.*

DR. W. H. HENGSTLER: There are just two things about the report of the Committee on Medico-Legal Affairs to which I would like to call your attention. One of them is the recommendation that each component society of the state organization appoint or designate one of the standing committees as a Committee on Medico-Legal Affairs, in order to establish with the state committee the proper liaison, particularly in malpractice suits.

It is the desire of the state Committee on Medico-Legal Affairs to coöperate as fully as possible with all the county and local societies in all medico-legal affairs which may come up, and especially in malpractice suits.

We have requested or recommended in our report that each county society designate such a committee, and that the name of the chairman of that committee of each society be kept on file with the secretary of the State Association. In that way, in the event of any medico-legal difficulty arising in the local organization, or of a malpractice suit, if outside help is desired or advice is desired from the state committee, it can be secured more promptly and more rapidly through the secretary of the State Association from the state committee.

The second matter is that there be some adjustment made by the State Association with the insurance com-

panies relative to the payment of physicians for expert service rendered in malpractice suits. Heretofore there has been some difficulty and some misunderstanding between some of the insurance companies and some doctors who serve as experts in these trials, about whether or not they should be paid an expert's fee.

The matter has been called to the attention of this committee recently, and it is the feeling of the committee that there should be established by the State Association a policy which shall be state-wide in character and that shall have an understanding with the insurance companies as to the payment of fees for experts who go into court in malpractice suits.

It is my understanding that the Reference Committee has very kindly recommended that my committee be authorized to take this step with the insurance companies, and I need not make any further comment.

It seems very unfair that medical men should be required to render expert service in malpractice suits and not be paid for it, and yet some insurance companies have taken the attitude that this should be gratuitous service. My own feeling is that the medical man is paying for a policy for his defense the same as he is when he buys an automobile casualty policy, and that if any of his friends or confères are to be called into court to assist in his defense, in the event of a malpractice suit, they should be paid at least an adequate fee for so doing, by the insurance company.

Those are the only two matters I care to mention.

Dr. F. H. Magney: We approve the suggestions in this report and would recommend that this Committee on Medico-Legal Affairs would tend, through conferences with representatives of insurance companies, to attempt to establish a uniform fee for expert testimony in malpractice suits, and that some uniform compensation be established.

President Pearce: You have heard the comments of the chairman of this committee. You have had the report before you. You have heard the recommendation of the Reference Committee. The matter is now open for discussion.

There is one problem that was presented by Dr. Hengstler, and that is in regard to the payment of physicians acting as expert witnesses for the defense in malpractice suits. I think that matter is an important one. There may be a great difference of opinion about it. There may be some difference of opinion as to how it would affect the chances of the plaintiff. I would like to hear some discussion on that.

Secretary Meyerding: Dr. Hengstler talked to me about this matter, and then I had occasion to have some business with Mr. Ivarsen of the Ætna. In the talk with Hengstler, he said the ordinary fee of the expert was $100 a day. They thought that if a man did not have to leave his town, $50 would be all right in malpractice suits, in order to help the doctor, and $100 in case he had to go out of town.

I told this to Mr. Ivarsen. He said, "That is pretty strong." Then he said, "I don't know." Of course, when it is at home he gets a chance to take care of his practice pretty well and do a lot of work, but when he is away from home he is not able to do any work. He thought that was reasonable. He said, "We always pay our medical experts in malpractice cases. We have never tried to cut them down if they were reasonable."

Dr. J. P. McDowell (St. Cloud): I don't know what the experience of the rest is, but up in our country where they have a lot of suits of one kind or another, some malpractice and some that are ordinary liability suits, a doctor witness has to stay there the whole day long, whether he is in his home town or whether he is out of town. They are expected to stay there and hear all the other testimony so they will be able to refute it or agree with it.

I have never been able to do any practice while on a trial. I don't think we ought to do as some of them have done. Some men go up a couple of hours in the morning and a couple of hours in the afternoon and the insurance company pays them $100. The rest of the time they are at home working.

President Pearce: Is there any further discussion? We could entertain a motion from the House of Delegates endorsing the policy of asking insurance companies to pay for these services, or you might refer the matter to the Council, and they can discuss the thing further and possibly make some decision in the matter.

Dr. G. N. Ruhberg (Saint Paul): I make that motion.

President Pearce: Dr. Meyerding made another suggestion, that it might be a good idea to refer this to the committee which we hope to appoint later, which will deal with insurance companies, a committee that is going to deal principally with the matter of compensation practice, and they will be in direct contact with the insurance companies. Perhaps, in connection with Dr. Hengstler's committee, this matter could be taken up and decided. I think perhaps the best motion would be one to refer to the Council. Then they can pass it on to where it will get the most action.

Dr. Ruhberg: My motion was that the House of Delegates approve this. I think to get action on this thing Dr. Hengstler's committee is the best one posted and it would be better than any committee that it is contemplated to appoint. If you would empower Dr. Hengstler and his committee to negotiate with the insurance companies, talk with them in some manner, and come to a decision, I think we could get action quicker than by appointing a new committee which would not know anything about it. That would be my idea.

President Pearce: There is just one objection to that. We have had a committee, that Dr. Johnson spoke of, that has been in contact with the insurance companies. We hope that that committee will be a permanent committee, whose function will be solely the matter of adjusting matters between the medical profession and the insurance companies. I feel that it would perhaps be a little better not to have too many committees contacting these insurance people.

Dr. Hengstler's committee could get this thing across through this insurance committee, I think, with a little less confusion than they could if they themselves had to get the insurance people together. They are a hard lot of people to get together because there are a great many different organizations.

Dr. Ruhberg: Whatever the majority of opinion is, it is all right with me, but I think we ought to have action on this thing and have it decided.

President Pearce: Do you withdraw your motion? We haven't had a second to it.

Dr. Ruhberg: I will withdraw the motion.

President Pearce: Is there someone who wishes to make a motion to refer this to the Council? As the committee does not exist at this time, we can refer it to the Council.

Dr. W. F. Braasch (Rochester): I move that the matter be referred to the Council and the Council might also ask Dr. Hengstler's committee to sit in consultation with them.

The motion was regularly seconded.

President Pearce: You have heard the motion. Is there any discussion? Those in favor will signify by saying "aye"; opposed "no." The motion is carried.

If there is no objection, it is the sense of the House of Delegates that Dr. Hengstler's committee report be accepted.

(To be continued)

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CLINICAL CLASSIFICATION OF CHRONIC SUPPURATIVE DISEASES OF THE MIDDLE EAR*

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THE term, chronic suppurative disease of the middle ear, represents many different forms of disease, with which a variety of symptoms and a variety of pathologic changes are associated. There are cases in which the patient is annoyed because of continued discharge from the ear but in which the condition is innocent enough so far as danger to life is concerned, and there are cases in which the disease is a constant menace to life. The patient seldom seeks treatment because he fears serious complications might arise from extension of the chronic infection. Usually, he is most concerned in having a dry ear; perhaps, also, in ridding himself of an offensive odor from the ear and improving his hearing, and occasionally, he is concerned because of pain or dizziness.

The problem of otologists, primarily, is that of obtaining relief for the patient from the danger associated with the disease of the ear, and if possible, to secure a dry ear and improve the hearing.

Chronic purulent disease of the middle ear always follows one or more attacks of acute infection of the structures of the middle ear. There are many factors, local and general, influencing the continuation of infection of the middle ear and the production of a chronic inflammatory condition. To what extent the particular type of organism, causing the original acute inflammation of the middle ear, is responsible for the degree and seriousness of the ensuing chronic inflammatory condition is a question. It is true that infections of the ear occurring in scarlet fever, diphtheria, and measles are likely to be followed by a more serious type of chronic disease of the middle ear. This may be due, however, to the fact that the general debility accompanying these infections is much more marked than is the general debility associated with the more common and less virulent infections of the upper part of the respiratory tract. The perforation, whether the size of a pin point or involving the whole drum, is not necessarily significant of the degree or seriousness of involvement of the middle ear or the mastoid process.

Kopetzky stated that the prognosis as regards chronicity of a purulent lesion of the middle ear is best when the perforation is localized in the postero-inferior quadrant and becomes progressively worse when the perforation is in the antero-inferior, postero-superior and antero-superior quadrant, respectively, the outlook becoming worse in the order enumerated. A definite aid in the determination of the character of the chronic inflammatory disease in the middle ear, is the site of the perforation in the drum membrane.

The statement that it is never necessary to resort to surgery in the treatment of chronic infections of the middle ear and mastoid process is as difficult to accept as is the contention that all cases of chronic infection of the middle ear and mastoid process should be treated surgically. Experience has shown that some of the running ears encountered in practice will become dry and will heal following medical treatment; some will resist long-continued medical treatment, will become dry and will heal following surgical treatment, and some will continue to discharge in spite of medical and surgical treatment.

Several years ago, H. I. Lillie suggested an empiric classification of chronic infections of the middle ear, based on appreciation of the pathologic processes probably present. This classifi-

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cation may include all types of chronic infections of the middle ear and has been found satisfactory for all practical purposes. The classification has made it possible to determine the results of treatment in the various groups from the standpoint of the best method of treating various groups, results of treatment and the time consumed in carrying out this treatment. The results of this study have assissted us at The Mayo Clinic in giving the patient a worthwhile prognosis at the time of the original consultation. Chronic infections of the middle ear are divided into four groups as follows:

Group 1.—In these cases there is a thin, odorless discharge of mucus coming chiefly from the eustachian tube, usually with perforation in the antero-inferior quadrant of the drum. Evidence of a destructive process in the middle ear or attic is lacking. The discharge is increased with head colds and is most annoying to the patient at this time.

Group 2.—In this group the disease is confined to the middle ear. The perforation in the drum is usually central, that is, it does not, at any point, involve the marginal attachment to the annulus tympanicus. The perforation may be very small or it may involve most of the tense portion of the drum. The middle ear contains mucopurulent material, and granulations or polyps may be present. The ossicles may have been destroyed, but there is no evidence of active disease of the attic. Besides the disease of the middle ear, there may be a discharge from the eustachian tube.

Group 3.—This group includes cases in which there is evidence of disease of the attic combined, perhaps, with conditions described as being present in groups 1 and 2. The perforation in the drum is usually in Shrapnell's membrane or along the posterior margin. Although an artificial opening in Shrapnell's membrane would lead into Prussak's space, that occurring in chronic suppurative disease of the middle ear forms direct communication with the vault, and therefore, with the aditus ad antrum. In a marginal perforation, there is, at some point, absolute destruction of the peripheral edge of the drum, and, in a large percentage of cases, necrotic changes in the bone adjacent to the perforation. This type of perforation leads directly to the vault and to the aditus ad antrum. A marginal perforation involving Shrapnell's membrane or the postero-superior segment of the drum, or both, constitutes the ideal condition for extension of the epidermis of the external auditory canal to the antrotympanic cavity. The discharge from ears in cases of this type is foul. Cholesteatoma may or may not be present.

Group 4.—This group includes cases in which there are signs of irritation of the labyrinth or symptoms of extension of the disease to the sigmoid sinus, lateral sinus, meninges, or brain, or there is definite evidence of the presence of a cholesteatoma.

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CONSERVATIVE TREATMENT OF OTITIS MEDIA*

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THE classification of chronic otitis media into four types permits more accurate prognosis, and greater variation in treatment. The cases may be grouped as follows: (1) perforated ear drum through which mucoid is discharged; (2) perforated ear drum with drainage of pus and, sometimes, necrosis of the ossicles and bony structures; (3) foul, scanty discharge, infection, necrosis and possibly cholesteatoma, and (4) a combination of type 3, with irritation of or extension into the secondary structures.

In the care of all types of cases it is important to impress on the patient the need of adequate time for treatment and the necessity of daily treatments by a physician. It has been clearly

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demonstrated that home treatment with only occasional visits to the physician for observation is of little value. Patients should be impressed with the need for coöperation in the treatment and in the carrying out of prophylactic measures. Many of them are extremely sensitive to any manipulation of the ears as well as apprehensive concerning pain or discomfort.

It is essential to devote considerable time to each treatment to insure as thorough a cleansing of all cavities and recesses as possible; all débris granulation tissue and polyps must be carefully removed. Especially if the polyps are attached to the wall of the middle ear, they should not be torn away, as breaking into the inner ear, opening a direct pathway for infection to enter the labyrinth and subsequently the meninges, must be avoided.

Because almost all swimming beaches and pools contain organisms capable of producing infection, swimming should be prohibited. If the ear drums are destroyed, there is added risk in prolonged contact of cold water with the inner wall of the ear; it may set up violent vertigo and nausea similar to the reaction from the caloric test for the labyrinth. Also, the effect of water on the tissues and canal of the ear is a hindrance rather than an aid to healing, because it keeps the ear moist and often macerates the tissues, thus reducing resistance.

Patients with otitis media must be taught correct methods of blowing the nose; as a matter of fact the practice should be discouraged. With the drum perforated, there is danger of blowing air through the eustachian tubes and forcing the secretions into the ear from the nasopharynx. It has been observed frequently that with avoidance of this practice many ears (types 1 and 2) will become dry without other treatment.

Infections in the upper part of the respiratory tract should be combated in every way possible. If infected or enlarged tonsils, and adenoids continue the irritation or increase it, they should be removed.

Type 1: Perforated ear drum through which mucoid is discharged.—In these cases the patient often gives a history of intermittent discharge. The ear may remain dry for a considerable period, usually discharging during and following colds in the head. The discharge originates in the mucous membrane lining the middle ear and eustachian tubes; usually there is little if any necrosis, granulation tissue or polyps present.

Treatment is directed to the infection which may be present in the upper part of the respiratory tract, correction of the nose blowing habit, careful cleansing of the ear, exercising great care to avoid any possible trauma, followed by instillation of some medicament into the ear. At the clinic this usually consists of saturated solution of boric acid in equal parts of alcohol and 1:1000 solution of bichloride of mercury; 25 per cent solution of argyrol; 1 to 2 per cent solution of mercurochrome, and 1:500 solution of metaphen.

The ear is cleaned with hydrogen peroxide and sponged dry with cotton swabs, and any remaining moisture is removed by means of air blown into the ear with a hand bulb, or compressed air. Great care should be taken to avoid vertigo by the too free and forcible use of the compressed air. The solutions are instilled into the ear, the attic, and, if possible, the mastoid antrum by means of a thin, flexible, silver cannula bent upward at the tip which is attached to an ordinary metal syringe.

Recent literature has stressed the use of boric acid and potassium iodide up to 25 per cent in powder form and instilled into the ears by means of a powder blower. The zinc iodization method has been used by a number of aurists.

Type 2: Perforated ear drum with drainage of pus and sometimes necrosis of the ossicles and bony structures.—There is a greater tendency, in this type, to the formation of granulation tissues and polyps. The discharge is more persistent and the disease is more resistant to treatment, consequently, the prognosis as to the complete control of the discharge is somewhat less favorable. The prognosis as to the life and general well-being of the patient as in cases of Type 1, is good.

The treatment in these cases is essentially the same as in those of Type 1, except that it is of longer duration due to the secondary infection and deeper penetration of the disease into the tissues of the ear and nearby structures.

Type 3. Scanty, foul, discharge, infection, necrosis and possibly cholesteatoma.—The perforation in these cases may vary greatly in size and in situation. When the perforation is in the upper quadrant only, the treatment is more difficult and the prospect of a cure is lessened.

According to most authorities, cholesteatoma is

formed by the ingrowth of epithelium into the middle ear, attic and mastoid antrum. The desquamated epithelium collects in the cavities in the form of a soft mass. It has been thought that the destruction of bone was due to pressure but more recently, many investigators have come to the conclusion that the extension of the cavities is due to a chemical action, probably of lactic acid in the cholesteatoma.

Whether complications will arise in this type of case depends on the direction in which the softening and destruction of bone takes place. Should it extend inward, a pathway would be formed into the labyrinth with destruction or irritation of the latter; this would be manifested by vertigo, nausea, or possibly, manifestations of localized or generalized meningitis. The extension upward would lead into the cranial cavity with resultant meningitis, or possibly, brain abscess. In many cases the destruction of the bone has taken place outward and forward, producing a fistula external to the annulus. In other cases complete destruction of the inner portion of the posterior wall of the external auditory canal takes place, producing a natural cavity.

It is obvious that with considerable enlargement of the attic space and the aditus ad antrum, the drainage will be better and opportunities for thorough cleansing of the cavities will be increased, thus making the prospect of cure by conservative measures better and the chances of complications less.

The erosion of bone may extend posteriorly and penetrate the plate covering the sigmoid sinus, exposing this structure to the infection which is almost always associated with cholesteatoma. When the disease extends to other structures, producing symptoms other than the discharge and characteristic odor, then the indications for conservative treatment cease.

The conservative treatment in these cases is essentially the same as in cases of Types 1 and 2, except that more time is consumed, and the process of cleaning the affected areas is much more extensive. It may be necessary to remove the remaining portions of the ossicles. The débris in the attic should be carefully removed. An attempt is made to clean out the cholesteatoma in the mastoid antrum, which is often very difficult unless the portion of the outer wall of the attic has been eroded, thus providing a more direct approach. Even if the ear becomes dry and the odor disappears, after a course of treatment, a considerable portion of the cholesteatoma may remain. If the infection is eradicated and the cholesteatoma remains free of further infection, the patient will have no further trouble with the ear. The possibility of re-infection through the external auditory canal and the eustachian tube, is always present. Therefore, any estimate of the probable length of time an ear will remain dry in any particular case must be made with a good deal of caution.

Type 4. A combination of Type 3, with irritation of, or extension into secondary structures. —Conservative treatment is not indicated in these cases and surgical measures should be advised.

COMMENT

An analysis of the results of the conservative treatment of chronic otitis media in a large series of cases revealed that the ears in 54 per cent remained dry after treatment, and in 46 per cent they were still moist at the time treatment was discontinued; 10 per cent of the latter were subsequently reported to have become dry. The average duration of the disease was fourteen years. The average time of treatment of ears which became dry was three and six-tenths weeks; of those that remained moist, four and seven-tenths weeks. In cases in which the ears were dry when the patients were dismissed, 78 per cent of recurrences appeared to be caused by acute head colds.

INDICATIONS FOR SURGICAL INTERFERENCE IN CASE OF CHRONIC SUPPURATIVE OTITIS MEDIA WITH MASTOIDITIS*

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FROM the standpoint of the otologist, surgical intervention in serious forms of chronic suppurative otitis media and mastoiditis is indicated to prevent complications. This object is accomplished by thorough removal of the disease process before signs and symptoms indicative of extension of the disease become manifest. The patient may think the main object of treatment is to stop the discharge of which he has complained. As has been mentioned, discharge may persist following the best directed surgical efforts because closure of the eustachian tube and removal of the secreting membrane on the promontory of the middle ear, may be impossible. However, the serious threatening disease may have been completely controlled. From the surgeon's standpoint, the surgical efforts may have been eminently successful, but the patient, because of a persistent mucous discharge without offensive odor, may feel that the operation was not successful. Therefore, it is very important that the patient understands the situation clearly.

Although one always hopes that the effect of treatment may be beneficial to the hearing, and it is in many cases, it should be explained to the patient that the effect may be otherwise. The effect on the hearing is dependent on the amount and character of the resulting scar that forms over the region of the oval and round windows. In general, it may be said that impairment of hearing will not be greatly influenced by operation. In many cases, the hearing may be improved, and in some, the impairment may be increased. In cases in which it is necessary to consider operative interference for both ears, the effect on the hearing is always of more significance. The surgeon chooses to operate on the side that appears to be most seriously diseased, and awaits the result of this before operating on the other side.

When the disease is of such a serious nature that operation is urgent, the effect on the hearing is of secondary importance. The fact that the disease or its effect has already caused serious and permanent impairment of hearing is not a deterrent to operation.

Facial paralysis results from radical operations on the mastoid process because of the nature of the necessary surgical procedure; it should seldom happen, however, if the surgeon is thoroughly familiar with the anatomic structures involved. In certain cases, paralysis of the facial nerve may have already occurred as the result of the disease; in others, anomalies are present which could not have been foreseen. Injury to the facial nerve during operation results in immediate paralysis of the muscle of facial expression. Facial paralysis may appear hours or days after the completion of the operation, the result of edema, swelling or dehiscence of the facial canal; in such cases, the prognosis for recovery is exceptionally good. The patient should be warned of the possibility of this complication, but the danger may be safely minimized.

Postoperative meningitis, abscess of the brain, or thrombosis of the sigmoid sinus may occur. Abscess of the brain may have been present before operation but not recognized. The symptoms of silent abscesses of the brain are so vague it is impossible to recognize them. Symptoms may become manifest following the trauma of an operation. It should be emphasized that operation is indicated only in those cases in which serious types of disease are present.

In cases that have been classified in the clinic as Type 1, I believe the operation on the mastoid is misdirected. If operative measures on the pharyngeal or aural ends of the eustachian tube accomplish closure of the tube, all has been accomplished that could be reasonably expected.

In cases of Type 2 intra-aural procedures are indicated to remove polypi, exuberant granulations, casts of desquamated epithelium and occasionally necrotic ossicles. These procedures might be more properly considered as local treatment. In a surprising percentage of such cases excellent results are obtained. It may be necessary to repeat the treatment for a considerable time but the end-results will be good.

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In cases of Type 3, the borderline cases, the indications for surgical interference arise when the response to meticulous local treatment has not been very satisfactory. Operation in some of these cases may be regarded as optional and in others expedient. It is optional if the patients are extremely desirous of doing everything to cure the disease, even though the chances for cure are good if they can continue to be under the observation of a competent otologist. The operation is expedient if the otologist is not readily accessible in case symptoms occur that may have untoward significance. It is expedient, too, if the economic position of the patient is such that it is inconvenient for him to spend the time necessary to be under observation.

The local signs suggestive of inadequate drainage, necrosis, or inaccessible cholesteatomas, make contemplation of surgical interference more urgent. Inadequate drainage is suggested if the perforation in the drum is so small that effectual measures of treatment cannot be directed against the disease within the middle ear or attic. Sufficient enlargement of the perforation to permit adequate treatment may suffice. This obtains for the attic as well as the middle ear.

If the simpler intra-aural procedures do not control the disease, the intra-aural operation suggested by Tobey may be sufficient. If the external canal is so small as to interfere with good vision and manipulation of instruments, it is safer not to employ the method.

If the tense portion of the drum is intact, and the disease is obviously confined to the attic and antrum, the modified radical operation may be employed in selected cases. The drum and middle ear are not interfered with, thus avoiding exposure of secreting membranes on the promontory and the probability of a moist ear, and also avoiding interference with the hearing.

If evidence of necrosis persists, such as the presence of granulation tissue which does not contract, or probing continues to reveal bare bone, or the foul odor to the discharge persists even though it may be insignificant, some operative interference should be considered seriously.

If a foul odor persists without discharge, an inaccessible cholesteatoma is probably present. Realizing the pathologic effect of cholesteatoma, one would not hesitate to suggest operation. Marginal perforations with destruction of the annular ring are always to be considered of great significance in this connection. If the cholesteatoma is readily accessible, it can be completely removed in an occasional case. In such cases perhaps it is safer to err on the side of suggesting operation than to delay the operation unduly.

In cases of Type 4, in which symptoms and signs of serious disease are present, or there is even evidence of extension, such as facial paralysis, which is indicative of necrosis of the facial canal, labyrinthine irritation as manifested by nausea, vertigo, and so forth, localized headache, evidence of dural exposure, or chills and fever, suggestive of invasion of the blood stream, operative interference may be considered as a life-saving measure and should not be delayed.

It would apear, then, that the indications for surgical intervention in cases of chronic suppurative disease of the middle ear and mastoid process depends on several factors: the patient, his economic position, his residence, and the nature of the pathologic process. It is difficult to reduce to words the exact indications for operation in a given case; they are largely dependent on the clinical and surgical judgment of the otologist.

OPERATIVE PROCEDURE IN CHRONIC SUPPURATIVE OTITIS MEDIA WITH MASTOIDITIS*

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RADICAL mastoidectomy has been referred to as the operation of which the aim is to relieve chronic suppuration of the middle ear by conversion of the middle ear, antrum, mastoid cells, and external canal into one cavity, which would be drained by the external canal, and which would ultimately be lined by integument that is continuous with that of the membranous canal.

Credit has been given to each of a number of different men for being the first to describe this type of operation. Kopetzky stated that, in 1873, Von Tröltsch suggested a modification of the Schwartze operation, which in its essentials is identical with the present radical mastoid operation. The names of Küster, Körner, Stacke, Von Bergeman, Zaufal and Jansen, are linked with this operation and they all have been instrumental in its development. Stacke was the first to use a flap from the skin and the periosteum of the posterior and the upper wall of the canal and to introduce the flap into the cavity of the wound.

The type of operation to be used on the chronically discharging ear must be suited to the individual case. No laws applicable to all cases can be laid down. One of the less radical measures is ossiculectomy. This operation was first employed for improvement of hearing and relief of tinnitus, and is now used in cases of suppuration. Ludewig, in 1890, demonstrated that in a large percentage of cases, chronic suppuration of the ear was due to necrosis of the incus, and he, therefore, recommended that this ossicle, as well as the malleus, be removed in cases in which there was suppuration. To this measure, Stacke added removal of the external wall of the aditus. This operation was quite popular, and was advocated by Dench, Richardson, and others. Neuman and Gomperz, of Politzer's clinic, were the first to perform the operation under local anesthesia.

It is evident that necrosis must be confined to the ossicular chain, and that the mastoid and antrum must be free from disease if a good result is to be obtained by this measure. In skillful hands, the operation presents few dangers. The facial nerve, denuded of its bony covering in the region of the labyrinthine wall of the tympanum, may be injured during the operation, with resultant facial paralysis. The jugular bulb may be injured, and the foot plate of the stapes may be dislocated, with resultant injury to the labyrinth. The operation has been abandoned in favor of the surer, more radical operation.

In cases in which the mastoid cells have been replaced by dense bone, and in which the lateral sinus is very close to the posterior wall of the canal, and overlies the antrum, the operation advised by Stacke has its advantages. The intial incision is made close to the line of attachment of the concha. The skin and periosteum are retracted, together with the membranous canal. The remains of the membrana tympani can be recognized. The necrotic ossicles are removed and the lateral wall of the aditus is removed with Kerrison forceps or a small chisel. The posterior bony wall is then removed, back toward the antrum. The overhanging cortex then can be removed, and as much of the mastoid process as is found diseased. This procedure makes sure the uncapping of the antrum and lessens the danger of opening the sigmoid sinus when it lies close to the posterior wall of the canal. Its main advantage is that it enables the surgeon to overcome certain anatomic difficulties.

In some of the cases in which there are chronically discharging ears, in which there is little deafness and only a small perforation in the tympanic membrane, a modified type of radical operation may be tried. Postoperative convalescence is shortened because the tympanic membrane is left in place. It is well known that when the drum is removed the moist inner wall of the middle ear is left and continues to discharge. The modified type of operation is particularly desirable if the patient has only one useful ear.

Körner, Heath and Bondy have described op-

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erations in which the tympanic membrane and ossicles were not removed. In certain selected cases, this operation may be tried. Some good aural surgeons are opposed to it. If the operation is successful, the patient has retained his hearing and has had a shorter convalescence. If it is not successful, the typical radical operation can be performed later.

There is no doubt that in almost all cases in which there is evidence of necrosis, and cholesteatoma is present, or in which there is a possibility of intracranial extension, the typical radical operation should be performed.

A few points in performance of this operation deserve attention. The first is the incision. The center of the curvilinear incision behind the ear should be at least 5/8 of an inch (1.5 cm.) behind the auricular attachment. Richards has pointed out definite advantages to this, as follows: (1) when the posterior wound is closed, the suture line will be behind the posterior margin of the excavation, and will have, therefore, the firm support of the mastoid cortex, and (2) the outer wall of the bony cavity will be formed by the unbroken surface of periosteum that was lifted with the skin flap. Then the primary incision is close to the auricular attachment, the suture line would form a part of the outer wall of the bony cavity, and granulations which formed there might project in it and therefore interfere materially with final healing. Great care should be expended in lifting the anterior flap, with its periosteum. The membranous canal is then separated from the surrounding tissues. With the gouge and mallet the posterior wall of the canal can then be taken down as the cortex is removed. If sclerosis of the cortex is marked, it is well to remove no more than is necessary to expose the antrum. It is then possible to tell, by means of a probe, how large a mastoid cavity it is possible to have. The smaller the cavity after the operation, the quicker the healing. In many of these sclerotic mastoids, the sigmoid sinus lies forward, close to the posterior wall of the canal, and is easily injured. The lower that removal of the posterior wall of the canal can be carried, the more easily the postoperative care and the better the result. The bridge is best removed with the septal chisel. Great care must be taken at this point for fear of injuring the facial nerve or the external horizontal canal. The wider that the distance between the end of the posterior wall of the canal and the tegmen antri can be made, the easier the postoperative care and the greater the likelihood of a good cavity.

The superior wall of the canal can be removed in the process of removing the bridge. This wall should be very thoroughly removed in order to take away any overhang in the attic and eliminate the possibility of formation of a pocket. Epithelization also takes place much more easily over a smooth, level surface. The amount of work done on the inner wall of the middle ear must be determined by the amount of pathologic change present. The necrosed ossicles, that is, the malleus and incus, must be removed. Any curetting must be done very gently in order not to dislocate the foot of the stapes or to open the external horizontal canal.

The eustachian tube should be thoroughly curetted. The surgeon should bear in mind that the canal for the carotid artery lies below, and anterior to, the tube. The artery has been opened while curetting in this region. If the tube is thoroughly curetted and the membrane is removed, it is likely that it will become obliterated. The tensor tympani muscle, which lies above the tube, should be removed, together with the cochleariform process. The cells around the mouth of the tube should be thoroughly curetted. The hypotympanic space should be thoroughly curetted, and the surgeon should bear in mind that the jugular bulb lies directly under the floor of the middle ear, and that the dehiscences are sometimes present and the jugular bulb may be easily injured. It is sometimes necessary to remove some of the floor of the canal to obliterate this hypotympanic space. The region of the annulus tympanicus should be thoroughly curetted and every vestige of the tympanic membrane should be removed. It is possible that the secondary drum, which so often forms in cavities after radical operation, is due to incomplete removal of the annulus tympanicus.

The advisability of skin grafting in the middle ear and mastoid cavity is still disputed. Some surgeons prefer that the graft be made at the time of the operation. This, however, does not seem to me to be a sound surgical procedure, for it is difficult to see how a skin graft can take on the surface of bare bone. If skin is grafted, it seems to me that it is better to delay the procedure for ten days or longer, because by that time the bone is covered with healthy granula-

tions and will take the graft. If skin grafting is done, it can be accomplished after the method of Mosher, Dench, or others. If, however, the eustachian tube is thoroughly curetted and the canal obliterated, I do not see so urgent a need of skin grafting. I do feel, however, that attainment of certain effects desired when radical operation is performed, such as a good cavity and a dry ear, depend entirely on whether the eustachian tube can be closed off. If it is not possible to obliterate the tube, but it is possible only to close off the mouth of it by means of a skin graft, it is very likely that any forcible blowing of the nose will rupture the resulting thin membrane. Complete obliteration of the tube is much more desirable than its closure by a skin graft.

The type of procedure used must vary with the condition found at the time of operation. If the cavity is small, in other words, if sclerosis has destroyed many of the mastoid cells, it may be possible to get a very good result by utilizing the method of Bárány. In this type of procedure no plastic is made, the membranous canal is left intact, and the cavity can be dressed both through the external canal and through the lower angle of the wound. If dura has been exposed over the middle fossa and the sinus, it is not wise to cover these structures with a flap. The making of the flap should be delayed until some granulations have developed on the dura and sinus, or the flap should be removed entirely.

The type of flap made should be governed, as mentioned, by the type of cavity formed; some modification of the method of Pansy, Körner, Siebenmann or Ballance, should be used. Too much stress cannot be laid on the postoperative care of the cavity resulting from radical operation. Different persons respond differently to the same treatment. No certain measures can be laid down which will apply universally. It is a mistake to say that all of these cavities should be tamponed thoroughly in order to minimize the formation of granualtion tissue. Some cavities respond best when nothing but boric and aristol powder are used. It is necessary to remove the granulation tissue by means of a biting forceps or curet if it becomes too abundant. It is sometimes best to allow some organization of granulation tissue to take place before its removal. Treatment by radium and roentgen rays often can be used to advantage in bringing about organization of this granulation tissue. I believe that the type of operation and the type of treatment must be determined in each individual case.

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THE ACHLORHYDRIC ANEMIAS*

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So sweeping have been our new conceptions of the anemic states that the older theories and classification might well be abandoned and the chapters on the subject rewritten. A perusal of the older literature would surely confuse the initiate in Medicine in its discussion of the etiology, physiology, pathology and therapeutics of the anemias, and to those acquainted with the newer discoveries it is of interest chiefly because of its historical and clinical value.

The designation of anemias as primary or secondary has lost its former significance and the term "primary" is presently not applicable unless, possibly, in the case of chlorosis, a subject which has not been intensively studied in the last two decades because of the almost complete and mysterious disappearance of the entity. The term "secondary" may be applied in relation to known etiological factors, but to classify anemias as secondary merely because they have some of the characteristics of true secondary anemias is fallacious and misleading.

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Most noteworthy has been the identification of the deficiency anemias due to the failure of function of integral factors in the gastric juice and their interreaction with various food elements. This has led to a more practical elucidation of the mode of production of anemias associated with achlorhydria, intestinal parasites, the effects of extensive gastric operations, sprue and to a lesser degree avitaminosis and other nutritional disturbances. In fact, the association between improperly functioning gastric juice and the production of anemia has rendered the organ a much more important link in human physiology than its digestive faculties have revealed and has given it a prominence which its position as the monitor of the digestive tract might suggest.

The group of anemias associated with these disturbances has attained a clinical interest and a numerical frequency fully as important as those due to more obvious causes, such as acute blood loss, malignancy, severe, long-standing infectious processes and those due to regenerative and disintegratory faults. Therefore because of their importance in the light of newer investigation which should be within the knowledge of every practicing physician, our interest will be focused on the so-called achlorhydric anemias.

The association of pernicious anemia and the absence of hydrochloric acid was first described by Fenwick in 1877 and before long this finding was recognized as an important diagnostic accompaniment and now is virtually considered an essential desideratum of the disease.

In 1903, Einhorn[4] recognized the absence of hydrochloric acid in anemic patients not of the pernicious anemia type, and others described its absence in a large percentage of patients with anemia associated with hypothyroidism, menstrual irregularities, sprue, intestinal parasites, pregnancy, splenic anemia, infantile anemias in general and many of the so-called secondary anemias of undetermined origin.

Lewis' statement that "The continued separation of disease into types, though of practical help, tends to overlook common, underlying mechanisms," seems almost prophetic in relation to the achlorhydric anemias and clinical suggestions as to their broad application and practice were soon forthcoming.

Faber,[6] in 1909, recognized anemias associated with achlorhydria which were not of a severe type. In 1913[7] and 1924,[8] he again published papers on the subject of simple anemias associated with achlorhydria and stated that in his observation 41 per cent of achlorhydric patients had anemia.

Working at it from a different angle, Paterson[22] and Kelly[13] in separate papers in 1919 and Plummer and Vinson[23] in 1922 described anemic states identical with our present conception of simple achlorhydric anemia, differing only in the observance of a preponderance of dysphagia as a presenting symptom. In ten of such patients in whom gastric juice analysis was made by Moersch and Conner,[19] hydrochloric acid was found to be absent in eight.

In 1928, Schneider and Cary[26] examined the blood of ninety-three patients with achlorhydria and found nine evidently due to pernicious anemia and seventeen of a more simple type, not specifically identified. This relative numerical preponderance in favor of the simple anemias as compared to the more serious form has been repeatedly identified since as about two to one, in about the same proportion as discovered by Schneider and Cary.

Mills[16] credits Watkins[28] and Kaznelson, Reimann and Weiner[12] with the first good description of the disease, but Witts[30] in 1930 first made a definite distinction between pernicous anemia and the more benign hypochromic type associated with achlorhydria and called it simple achlorhydric anemia.

As is apparently the custom of writers, others sought an improvement in the terminology and the condition has been variously called achylic-chloranemia, chronic chlorosis, microcytic anemia, chronic or primary or idiopathic hypochromic anemia, etc., to the consequent confusion of the reader. The terminologic distinction between pernicious anemia and the more benign disease can best be made by calling the one "hyperchromic" and the other "hypochromic" in view of the essential chromatic difference in the red blood cells, a characteristic differentiation and incidentally effecting simplification in the nomenclature.

Wherein the similarities and dissimilarities in the two conditions lie, a necessary consideration in the diagnostic, prognostic and therapeutic approach?

Confusion of identity arises primarily, I believe, in the fact that in both conditions there is an absence of hydrochloric acid, anemia, adult

age and a subjective complaint of paresthesias and soreness of the tongue. An enlargement of the spleen is likewise not infrequently noted in both conditions. It is also of interest to note that certain conditions, such as the presence of intestinal parasites, pregnancy and extensive gastric resection may induce the development of either in their wake, evidently depending on the type to which the patient is conditioned. Fatigability, weakness, shortness of breath and lassitude are common presenting complaints in both conditions. Digestive symptoms are not particularly frequent in spite of the gastric juice disturbance.

But these apparent similarities need qualification. Achlorhydria is not universally present in the more simple hypochromic type. About 15 per cent of the patients have hydrochloric acid present, but almost invariably reduced below the normal amount, the latter a finding which virtually precludes a diagnosis of a pernicious form. Davis[3] has studied the gastric juice in both conditions extensively, testing the secretion from the fasting stomach and found that in pernicious anemia the secretion is about normal in amount, but is not increased in quantity by the administration of histamine. The secretion is free of mucus, but has a copious deposit containing an abundance of desquamated esophageal cells which he believes is a characteristic finding. In hypochromic anemia the amount is scant—often no more than a few cubic centimeters, characteristically thick with mucus and free of any great cellular deposit. Gradations occur between these two extremes which seem to parallel clinical grades of the disease from the classical simple type to the classical severe type.

Borderline cases are sometimes confusing, a phenomenon which might be anticipated in view of the familial association of both types as found by Witts,[30] Patek,[21] Faber and Gram,[8] Conner and Davis,[5] the clinical pictures in the family showing composite features. Interestingly, many of these cases, many of which seem to have the characteristics of the type called "pseudo pernicious anemia" by Watkins,[28] respond to liver treatment and according to Witts and Davis usually show macrocytes in the blood smear, though otherwise in their clinical course appearing benign. These observations would explain the occasional apparent change from a hypochromic to a hyperchromic variety and also in turn the occasional instance of pernicious anemia with a low color index as described by Faber[7] and Zadek.[31] Not infrequently patients show a low color index like the true hypochromic variety, but a low color index is occasionally observed in true pernicious anemia and in the event of complications and occur in remission after splenectomy and as improvement is being effected with liver therapy.

These observations lead one to believe that slight variations in the gastric juice which tend to upset the biological equilibrium cause the development of one or the other type of anemia. As shown by Castle[1] and his associates, it is now believed that pernicious anemia is caused by the failure of production of a stimulant to normal bone marrow function due to the failure of interreaction between a certain intrinsic factor in the gastric juice, not specifically identified, and some extrinsic factor in the ingested food. Dameshek[2] suggests that another factor apparently is lacking in the gastric secretion which prevents the normal metabolism of iron and causes hypochromic anemia. As Minot[17] has stated, there appears to be a conditioned efficiency. In neither condition is the hydrochloric acid restored with treatment if absent when treatment is begun.

The glossitis in hypochromic anemia is not as severe as in the hyperchromic type, having an inclination to the smooth, "bald" tongue rather than the red, inflammatory reaction of pernicious anemia. With improvement through treatment, symptoms in the tongue tend to subside. Fissured lips and cracks at the angles of the mouth are more common in the simple hypochromic type. Premature graying and brittleness of the hair is a symptom common to both types.

The subjective paresthesias in the hands and feet are likewise a source of complaint in patients afflicted with either disease, but in the simple type the compaint is not so frequent and not so insistent for relief. Only under the rarest circumstance, is the development of combined sclerosis described as occurring in the more simple anemia, and there is a question as to whether the paresthesias should be considered as evidences of cord involvement. It is more likely that they are due to circulatory and neural causes.

The age of the patient afflicted with hypochromic anemia tends to be under forty-five and

though most of them occur between the fourth and fifth decade of life, the history usually reveals the complaint extending back many years. In hyperchromic anemia most of the patients are above the age designated.

So much for the similarities which may be confusing. The differences in the two types aside from the qualifications mentioned above are so striking that confusion should rarely arise.

One of the interesting features about hypochromic anemia is its marked tendency toward a feminine predilection. Instances have been cited in males, but it is so rare that a suspected case in a male must be viewed askance. Its essential chronicity, unlike the relentless course of the untreated pernicious anemia case, is also noteworthy. Most patients complain of having been anemic for years with only slight and inconspicuous remissions due to the failure of relief because of a lack of acquaintance with the need of vigorous iron therapy.

A careful study of the blood smear is of prime importance, diagnostically. Whereas in pernicious anemia the color index is high due to the hyperchromasia and the presence of macrocytes, the antithetical finding of microcytes and hypochromasia renders the benign type low in the color scale. The red cell count is not so appreciably reduced in the simple hypochromic form, but the hemoglobin may recede to 30 and the red blood count to 2,000,000 to 2,500,000. Leukopenia is noted in both states, but there are more frequent normal values found in the hypochromic type and instead of the relative lymphocytosis, as found in pernicious anemia, cells of the myeloid series prevail. The average cubical cell measurement is less than normal, as one might postulate, whereas the opposite is true in pernicious anemia. The hematocrit shows a lessened cell volume. Smears from the bone marrow, according to the technic of Seyfarth or others, is rather an impractical clinical method in practice, but in hyperchromic anemia megaloblasts will be found whereas in hypochromic states nucleated red cells of the normoblastic type are found, though usually in the percentage of about thirty-five instead of the normal of twenty. The blood serum bilirubin in the simple form is within the normal limits. The icterus index is normal. Urobilinuria is also absent in the more simple type and the indirect van den Bergh reaction is negative. Correspondingly, the sclerae are pale or blue and not subicteric as in pernicious anemia.

A finding in hypochromic anemia, frequently overlooked but characteristic when present, is an unusual flatness or brittleness of the fingernails, more pronounced on the thumb side of the hand and receding in degree as one approaches the little finger. In many instances the fingernails have a typical scaphoid appearance which Kaznelson pointed out are able to hold a drop of water in their concavity. Some writers speak of the tendency to bruising of the skin in the simple anemias on slight trauma.

The metabolic rate is often reduced below the normal in hypochromic anemia, a point conspicuously found by Plummer and Vinson.[23] In the hyperchromic type the metabolic readings are normal. Menstrual disturbances have been frequent associates of simple achlorhydric anemias, often enough, at least, to cause etiologic confusion in the observer, particularly since there seems to be an improvement with the cessation of menses, artificially or physiologically induced. Whether this is a result or a coincidence one cannot say.

It might impress one as singular that the identity of simple achlorhydric anemia should go unrecognized so long, but since in its more obvious appearance it is not unlike the usual secondary anemias of known etiology, it is not strange. The effects of copious or recurrent bleeding, severe toxic states, chemical agents, malignancy and nephritis are so similar in the production of subjective symptoms and blood findings as to confuse a proper analysis of an entity so like in many aspects. This has led physicians to call all similar clinical conditions associated with hypothyroidism, menstrual irregularities, dietary deficiencies, hemorrhoids, pregnancy, foci of infection, neurasthenia or constipation as secondary to these factors, and to erroneous conclusions, in an endeavor to assume an etiologic instead of a coincidental relationship. It is, as it were, a failure to see the forest for the trees.

It may be said, however, that in a patient already conditioned because of his gastric disfunction to a disturbance in the hematopoietic balance, that these associated factors may exact greater demands, too great for the threshold regenerative capacity of the subject. There has been too great a tendency to classify all anemias not of the pernicious type as of a secondary na-

ture, specific interest being lessened by the fact that the disease is far less serious and disabling, and because the older methods of treatment were ineffective in its relief. The failure of relief in many patients who have had treatment for menstrual irregularity, recurring minimal bleeding (as from hemorrhoids), foci of infection, etc., is due to the fact that the coincident achlorhydria and its significance was overlooked. The question might be raised as to the relationship between this concept and the chlorosis of the older writers. Little is known of true chlorosis by physicians at the present time, but apparently chlorosis as described by the older clinicians had a tendency to occur in young females, and seemed to disappear with full maturity and pregnancy. Though there may be some uncertainty as to the gastric juice findings in the patients with chlorosis there seems to be a fair unanimity of belief that hyperacidity was far more common than the reverse. The report of frequent association with gastric ulcer would tend to support this view.

The discovery of the use of liver therapy in pernicious anemia by Minot and Murphy,[18] after the suggestion of Whipple and Robscheit-Robbins,[29] is truly one of the great discoveries in medicine in recent years, equal to if not surpassing the work of the Toronto school in the discovery of insulin. Many experimental and clinical investigators' names should be added to these, but any one who has seen the change from a fatal disabling disease to a relatively innocuous condition, as has been the case with pernicious anemia, due to the efforts of these investigators, is struck with admiration.

In pernicious anemia the prime essential in treatment is a potent preparation in sufficient amounts to relieve the anemia and to avoid the relapses which may lead to disaster, notably by affecting the spinal cord. When there is evidence of spinal cord involvement the amount of liver employed should be doubled, though some writers are still skeptical of the value of liver treatment in this unfortunate complication. Whether one uses liver extract or gastric extract, by mouth or parenterally, matters less than that enough of the preparation be given. If economy is a necessity a homemade liver extract may be used, though no compromise should be made with safety. Half a pound of fresh liver should be run through a grinder of sufficient fineness to insure a thick, creamy, pulpy mixture, to which may be added pepper and salt, and the mass thoroughly mixed and crushed with an eggbeater. Riddle and Sturgis[25] advise an average consumption of 3000 grams of liver as adequate for a normal reticulocyte response and a restitution to normal blood findings, or the equivalent of 400 to 600 grams of liver per day, for continuous treatment until the patient appears to be normal, when the subsequent dosage is adjusted to the needs. If intramuscular extracts are given, the equivalent of 400 grams of liver should be given in ten days and then the equivalent of 100 grams each week. Though these figures are suited to the average situation, one must not lose sight of the fact that enough must be given to bring the patient's blood picture to normal and the maintenance dosage must be sufficient to retain it at that point. The physician might well study the equivalent in values of the various liver extracts for oral administration and relative cheapness should be no inducement for substitution; only the best should be used. Preparations made from the gastric mucosa, which represent both the intrinsic and extrinsic factors are of equal value when properly employed. The intramuscular injection of liver has certain advantages. In cost, Middleton[15] has observed that the intramuscular method is cheaper than the oral. One also knows the amount of assimilation, and the method offers the advantage of occasional observation by the physician for the opportunity of making a clinical analysis of the situation and altering the dosage as may seem necessary. In patients who must be guided at some distance the method may not be quite so safe. Unless an improvement is affected, as has recently been suggested by Isaac and Sturgis,[11] with the use of permutite and acetone, I do not believe that the intravenous method has a very frequent indication. Other suggestions, as the use of concentrated gastric juice by Morris,[20] and the use of marmite by Goodall,[9] which is a concentrated B2 vitamin preparation and which is said to be effective, need be investigated further before they are accepted, but the practising physician must have an open mind and a curiosity toward the literature, to keep apace with developments, since they are rapid and at times quite revolutionary.

Though iron has a specific value in the hypochromic anemias its effect is probably not quite

so universal as the result of liver therapy in pernicious anemia. This statement, however, must be immediately qualified by saying that as presently employed it is a sovereign measure. A hundred years ago Blaud already deprecated the tendency to use iron in smaller doses than those suggested by him, but it was not until 1917 that Lichenstein[14] and later Sonne[27] in 1920 proved that massive doses of iron were necessary if satisfactory results were to be obtained. In the secondary anemias due to malignancy, nephritis, cirrhosis, hemolytic icterus and those due to pernicious anemia and in normal subjects iron is of no value. The need for careful differentiation in the diagnosis is therefore paramount. The use of iron remained in disrepute probably because too much stress was laid on possible causes of the anemia, such as foci of infection, menorrhagia, hemorrhoids, constipation, etc., and too little on any other therapeutic approach. The almost total disappearance of the old type of chlorosis, likewise, no doubt, lessened interest in the use of iron. Certainly iron was used injudiciously in many varied conditions, and when employed was used in insufficient amounts. One should not fail to remove any accessory factor that may be operating, such as the injunctions regarding a suitable diet, the removal of infection, rest, fresh air and sunlight, the prevention of blood loss, etc., but as a rule there will be no effect in simple achlorhydric anemia unless large doses of iron are used coincidentally. In very severe cases, transfusions (small amounts into the hip or larger amounts intravenously) are often of striking initial benefit, especially in the more severe cases, but since iron has been used in doses sufficient to meet the situation the need for transfusion is considerably reduced. One gram of metallic iron should be given per day, and according to Elvehjen[5] the inorganic iron is better than the organic form, and Reimann and Fritsch[24] long ago pointed out that the ferrous salts were probably more effective than the ferric. Reduced iron consists of about 100 per cent iron, but there is probably a relative waste in absorption as compared to other preparations. It is used commonly on the Continent. Ferri et ammonii citras and Vallet's massa ferri carbonatus each contain about 17 per cent iron, and 6 grams per day would be a suitable amount to use. Blaud's mass and saccharated iron carbonate contain about 7 per cent iron and would have to be used in double the amounts, at least, in order to effect the same results. Blaud's pills contain so small an amount of metallic iron that thirty to forty per day would be necessary to be the equivalent of the iron ammonium citrate or Vallet's mass suggested.

The iron should be given regularly or in courses, probably the former, since cessation in treatment and very simple complications tend to cause a relapse, the biologic equilibrium evidently being very delicately balanced. Occasionally, patients object to the use of iron because of the development of nausea, diarrhea or cramps in the abdomen. These complaints are usually easily overcome and may or may not be due to the iron, opinions differing on the subject. Hart and Steenbock[10] since the publication of their paper, and certain writers, have advised the use of copper, presuming a catalytic action in conjunction with the administration of iron. Iron alone seems to be effective, and I doubt whether the use of copper is in any way an adjuvant. On the other hand, it is possible that the iron as administered may contain sufficient traces of copper so that a catalytic reaction may result. Finally, it is not to be forgotten that in patients who have a hyperchromic anemia in some measure indistinguishable from the more severe type, particularly if macrocytes are present, liver treatment may be tried with distinct advantage.

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THE DIAGNOSTIC SIGNIFICANCE OF PUPILLARY CHANGES*

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JUSTIFICATION for a study of this kind, which is not based upon original research of any consequence, and which, therefore, does not pretend to enunciate any hitherto unknown facts, can only be based upon an effort to summarize, for purposes of practical clinical diagnosis, what appear to be the established facts in regard to the physiology and pathology of pupillary changes.

In spite of the fact that the significance of these changes has been recognized from the earliest days of recorded medical history, it is, unfortunately, not at all an infrequent occurrence, even at the present time, to find them overlooked or misinterpreted.

Early recognition and correct interpretation of pupillary phenomena may be of great practical clinical importance. The movements of the iris border forming the pupil is dependent upon three factors:

1. The action of the constrictor pupillæ muscle, which effects the contraction of the pupil.

2. The action of the dilatator pupillæ muscle, which brings about the dilatation of the pupil.

3. The function of the intrinsic nervous mechanism of the iris which, in the event of the isolation of the iris from its connections with the central nervous system, is capable of causing a contraction of the pupil.

Our knowledge of many of the details of the anatomy of the nerve paths governing pupillary movement is, unfortunately, incomplete. Therefore, in many instances, conclusions must be based upon physiological or pathological observations rather than upon definitely demonstrable anatomical facts. However, the generally accepted conception in regard to the innervation of the pupillary muscles may be summarized as follows:

The sphincter pupillæ muscle is supplied by the parasympathetic fibers of the oculo-motor nerve.

The dilatator pupillæ is innervated from the cervical sympathetic.

Both sphincter and dilator are composed of smooth muscle formed from the anterior layer of the secondary optic vesicle and are, therefore, of ectodermal origin.

Like smooth muscle in other parts of the body they are maintained in a constant state of tonus. The two muscles have a mutually antagonistic action and are maintained in a state of balance by reciprocal innervation, contraction of one being always accompanied by relaxation of the other.

The constrictor mechanism is comparatively simple. That a mesencephalic center exists is obvious. This is probably located in the Westphal Edinger nucleus, a small-celled conglomerate under the anterior portion of the lamina quadrigemina.

The fact that ophthalmoplegia interna and ophthalmoplegia externa are sometimes associated and sometimes observed independently would indicate that the center for the muscles of

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the iris is near that supplying the extra-ocular muscles but distinct from it.

The afferent pupillo-constrictor pathway begins in the retina and is continued in the optic nerve, chiasm and optic tract. It leaves the tract to reach the constrictor center. The efferent pathway is through the para-sympathetic fibers of the third nerve to the ciliary ganglion, where they are relayed and travel through the short ciliary nerves to the constrictor muscle.

The nervous mechanism controlling the dilatator pupillæ is extremely intricate. Derived from the cervical sympathetic, the motor fibers of the dilatator pupillæ leave the cord by the rami communicantes of the lower cervical and upper dorsal roots passing over the stellate ganglion to the annulus of Vieussens where most of the fibers pass into the anterior cord. From here they run up the cervical sympathetic to the superior cervical ganglion. Up to this point the fibers have been medullated but the post ganglionic fibers are non-medullated. They run in the carotid plexus to the Gasserian ganglion, where they join the nasal branch of the first division of the fifth nerve and reach the eyeball through the long ciliary nerves.

There is a midbrain center probably located in the hypothalmic region and there are centers in the cortex (particularly in the frontal lobe) which are concerned with pupillary activity. The pathway from the cortical area does not decussate. However, a partial decussation does take place between the hypothalmic center and the spinal center.

Lauber and others have demonstrated a delicate intramural iris plexus mixed with small ganglion cells. This is the intrinsic nervous mechanism of the iris to which reference has been made. We are concerned primarily with two principal reflexes: the light reaction acting through the reflex arc described as controlling the contraction of the pupil, and the sensory (or psychic) reflex acting through the sympathetic. Both reflexes are, of course, involuntary and unconscious. The size of the pupil is dependent upon the balance between these two reflexes. The reaction to light, under normal conditions, always affects both eyes, *i.e.*, if the light falls into one eye only, the pupil of the other eye contracts. The contraction in the second eye takes place at the same time and in practically the same degree as that in the eye directly exposed to the light.

This consensual reaction is probably carried out by means of fibers which unite the two constrictor centers in the third nerve nucleus. In addition to the reflexes the diameter of the pupil is influenced by what are termed associated reactions.

The most important of these is the one which accompanies the adjustment of the eyes for near objects or what is known in the German literature as the "Naheinstellungsreaktion." This comprises convergence, accommodation and the vertical adjustment of the eyes to focus upon near objects. The muscles concerned are all innervated by the oculo-motor nerve, so that their associated action is the result of a simultaneous excitation of the portion of this nerve which supplies them. All associated reactions of the pupil result in a contraction.

Abnormalities of the pupillary reactions result from three general causes:

1. Local conditions in the eye. These may appear as the result of disease affecting the eye itself, such as glaucoma, sympathetic opthalmia, etc., or in diseases of the retina causing a diminution or loss of vision. They may be the result of local conditions involving the iris itself, such as congenital anomalies, traumatisms or disease of the iris tissue.

2. Conditions causing either stimulation or paralysis, partial or complete, of the nervous mechanism of the constrictor.

3. Conditions giving rise either to stimulation or paralysis of the sympathetic nerve supply of the dilatator.

In accordance with the double function of the retina and the opticus neurones carrying impulses to the higher visual centers, any damage to the retina or optic nerve affects not only the vision but also the reactions of the pupil. Therefore, in general, lesions causing a loss of vision also cause a loss of the light reflex as well. This constitutes the so-called amaurotic pupillary paralysis. Sometimes, when the destruction is less complete, the loss of vision is only partial and then the pupillary reaction may be sluggish but not entirely absent.

A number of cases have been reported of disease of the retina or optic nerve giving rise to atrophy and total loss of light perception, in which there has been a retention of the pupillary reflex. Bumke, von Hess and others have expressed the opinion that in most instances the

tests have not been made under properly controlled conditions, but enough instances have been observed by dependable clinicians to establish the fact that this does, in rare instances, occur. This can only be explained by the assumption that the fibers in the retina and optic nerve concerned with the pupillary reflexes are distinct from those subserving vision. These cases must, of course, be carefully differentiated from those resulting from lesions of the higher visual tracts, that is the occipital cortex and optic radiations.

Our present methods of testing the reactions of the pupil leave much to be desired. There is no generally accepted standard of intensity of illumination. It is possible only to estimate roughly the reaction time except with special apparatus (motion pictures, etc.) which would not be available to the clinician. The testing of the light reaction consists in the observation of the response of the pupil to variations in intensity of light. This is, then, a "Differenzreaktion" in which a constant light adaptation is assumed. The reaction should be tested in light that is not too bright and so arranged that the illumination falls equally upon the two eyes. In order to elicit a strong response in testing the near-adjustment reaction, it is advisable to have the patient look first in the distance and then suddenly fix his attention on an object held about 10 cm. from the eye. This test should be made in subdued light.

I will now consider, as briefly as possible, certain of the more important derangements of pupillary reaction.

Reflex immobility of the pupil was first described by Argyll-Robertson in one of the classic contributions to medical literature. It is the most widely known and frequently mentioned of all pupillary signs but there is still a considerable vagueness of conception and some diversity of opinion as to exactly what constitutes a true Argyll-Robertson pupil. The impression that it is simply one which reacts to accommodation but not to light is responsible for many incorrect diagnoses. The most logical conception of the Argyll-Robertson pupil is that of McGrath. He defines it as "a complex phenomenon consisting of various components, all equally important and invariable," these components being:

1. Alteration in the size of the pupil (miosis).
2. Alteration in the form (irregularity).
3. Inequality in size.
4. Impairment or loss of the light reflex.
5. Alterations in the color and texture of the iris.

Even at the present time, nearly sixty-four years after the publication of Argyll-Robertson's monograph, there is a diversity of opinion as to the location of the lesion causing this condition. It must, of course, be somewhere in that portion of the reflex path which lies between its centripetal limb (optic nerve) and its centrifugal limb (oculo-motor nerve).

The most generally accepted theory is that it is located in the course of the afferent fibers running from the optic tract to the mesencephalic center, but McGrath outlines very convincing reasons for believing it to be in the ciliary ganglion.

However this may be, in order to establish a diagnosis of true reflex immobility of the pupil the changes described above must be present. The pupil is always miotic. In monocular cases, therefore it is always smaller on the affected side. It further tends to lose its roundness and become irregular in shape. This has been attributed, even in very recent literature, to irregularity in the relaxation of the sphincter tonus but convincing evidence has been adduced to the effect that it is, in reality, due to trophic changes in the iris tissue. The resulting atrophy can often be demonstrated even without the slit lamp. Developing unevenly in different sectors of the iris, it is the real cause of the irregularity in the shape of the pupil.

The question of an exact conception of what constitutes a true Argyll-Robertson pupil is not a mere academic one but is of very definite clinical importance since it is, when present, an evidence that a degenerative process is at work in the nervous system.

I do not believe that the true Argyll-Robertson pupil, in which all of the mentioned characteristic findings are present, is ever found in anything except cases of syphilis of the nervous system.

It has been described as being observed in epidemic encephalitis, in tumors of the corpora quadrigemina, in chronic alcoholism, in diabetes and, in monocular form, in herpes zoster ophthalmicus, etc. Careful examination of these cases will, however, demonstrate that they do not, in all particulars, meet with the requirements of this definition and are not, therefore, to be classed as true Argyll-Robertson pupil.

It is of importance to differentiate clearly between the cases of true reflex iridoplegia and those of the various types of pseudo reflex paralysis. Axenfield first described certain traumatic oculo-motor paralyses in which, in spite of the apparently complete absence of the light reaction, the near-adjustment reaction remained unimpaired. Many of these traumatic cases (mostly monocular) have been reported in which a complete, or nearly complete, oculo-motor palsy cleared up entirely except for the permanent loss of the light reflex. It is probable that in such cases a degeneration begins in the fibers of the oculo-motorious near the nucleus and involves the nucleus secondarily. It is assumed that in the portion of the nucleus supplying the sphincter the regenerative process begins later and is less complete. Therefore a certain functional weakness remains which manifests itself in a loss of reflex excitability.

The tonic pupillary reaction.—In 1902 Strasburger and Saenger, working independently, called attention to this entity. It has been referred to as "Pseudo Argyll-Robertson pupil with absent knee jerks. It has probably been misinterpreted more frequently than any other pupillary sign. In it there is a tonic contraction, on accommodation or convergence, of a pupil which apparently does not react to light.

The fact that it is often associated with the absence of one or more of the tendon jerks has made it particularly liable to be mistaken for the pupil of tabes.

It occurs characteristically in healthy young people. The failure to react to light is not complete.

If these patients are kept in a dark room for an hour the pupils dilate to about an equal size. If they are then exposed to bright light the abnormal pupil first contracts slowly and then returns to its original size.

The reaction to near adjustment appears slowly but eventually is greater in extent than the normal reaction. It is very easily differentiated from the true Argyll-Robertson pupil as the accompanying table will show.

The fact that the tonic pupil is capable of contracting through a wide range shows that we are not dealing with a true paralysis. As Adie says, "The tonic reaction seems to be the expression of an unique kind of perversion of pupillary activity."

Its frequent association with abolished knee jerks and its characteristic appearance in patients in whom the most searching physical examination does not reveal any evidence of disease, makes it a really unique clinical entity and one which is very difficult, in the present state of our knowledge, to explain satisfactorily.

ARGYLL-ROBERTSON PUPIL	TONIC PUPIL
Invariably small. Miosis, in monocular cases, in affected eye only.	Invariably larger in the affected eye.
Constant in size and unaffected by light and shade.	Weak reaction to light after prolonged stay in dark room.
Bilateral in 95 per cent of cases.	Usually unilateral.
Contracts promptly and fully on near adjustment and dilates promptly when convergence and accommodation are relaxed.	Contracts very slowly on near adjustment and dilates slowly on its relaxation.
Dilates slowly and incompletely with mydriatics.	Dilates rapidly and completely with atropine or cocaine.
Pupil tends to become irregular in outline as a result of trophic changes in iris tissue.	Pupil remains regular in form. The iris tissue is normal.

Very much rarer than the Argyll-Robertson pupil is the opposite condition in which the pupil responds to light but fails to react on adjustment to near objects.

This condition may be the result of disease or traumatism. The precise location of the causative lesion is unknown. This phenomenon has been observed as a congenital peculiarity, in atypical tabes and in the late stages of epidemic encephalitis.

Absolute pupillary paralysis.—In this condition the pupil fails to react to any of the stimuli mentioned. It is, of course, not strictly accurate to classify this condition as an absolute paralysis since the dilatator muscle continues to function. However, in the absence of any function in the sphincter, the action of the dilatator is of little consequence and the condition may be regarded, clinically, as a complete paralysis.

The great majority of cases of absolute pupillary paralysis are dependent upon a sphincter paralysis in the eye itself but the arrangement of the structure of the centrifugal pupillary pathways is such that lesions of various anatomical characteristics may result in this condition. The

lesion may be in the sphincter nucleus, in the trunk of the oculo-motor nerve, the ciliary ganglion or the short ciliary nerves. It may, indeed, be supra-nuclear. In the latter event, with a complete loss of both light and near-adjustment reactions, the lid closure reflex is not only retained but heightened.

Absolute pupillary paralysis may be a congenital anomaly. In acquired cases, the most frequent cause is a cerebral syphilis. In patients in whom the paralysis of the pupil is associated with paralysis of the accommodation, the cause will be less likely to be lues and more probably the result of disease of the nasal accessory sinuses, botulism or some toxemia of unknown character.

Spastic mydriatic paralysis.—This rather rare condition is the result of a state of contraction of the dilatator pupillæ which is ordinarily associated with an inhibited sphincter tonus. This condition is observed in head injuries, in epileptic seizures, in extreme alcoholic intoxication and in schizophrenia. Sometimes, in highly neurotic patients and in post-traumatic hysterias, the resulting sensory or psychic excitation of the sympathetic may become a true spastic mydriatic paralysis and last for a considerable time.

Pupillary abnormalities due to affections of the sympathetic nerve supply to the dilatator may result from an excitation or a paralysis. Miosis and a narrow palpebral fissure may indicate interference with the conduction in the sympathetic tract. Much less frequently dilatation of the pupil and retraction of the upper lid with consequent widening of the fissure may accompany irritation of the sympathetic.

The oculo-pupillary syndrome resulting from a destructive lesion of the sympathetic fibers may be found in disease of any part of the tract. It may be met with in traumatisms of the cervical cord and in traumatic lesions of the brachial plexus in which the first dorsal root is injured close to its connection with the coard.

Accidental or operative wounds in the neck may affect the ascending sympathetic fibers. Diseases or neoplasms involving the medulla or the cord down to the level of the upper dorsal roots as well as intrathoracic aneurysms or mediastinal tumors may give rise to irritation and later to paralysis of the dilatator of the pupil. Pulmonary disease, particularly tuberculosis, may affect the pupil in the same manner and pupillary inequality is sometimes observed in aortic diseases. However, in affections of the aorta in syphilitic patients the anisocoria may be due to a concomitant tabes dorsalis.

To go into a detailed discussion of the various rarer anomalies of the pupillary reactions such as the different forms of paradoxical or inverted reactions, etc., would require an inordinate length of time and be of little general practical interest.

I should like to consider briefly, in closing, the pupillary phenomena observed following head injuries. In severe head trauma the pupillary signs appear early and are of great significance both in regard to the localization of subdural or epidural hemorrhage and in indicating the prognosis. In fact, the condition of the pupils is the most dependable sign in the determination of the site and the degree of the brain compression. It is much more dependable, for instance, than an accompanying hemiplegia. In severe head injuries the pupil on the side of the beginning compression at first reacts sluggishly. Later it becomes pinpoint and fixed, usually finally dilating slowly.

So far as the prognostic significance of the pupillary signs are concerned, it may be said that if the pupil is dilated but reacts to light, the prognosis is good.

If the pupil is dilated and fixed, the prognosis is extremely grave. Nearly 95 per cent of the patients in whom this is observed die.

When a dilated pupil which at first reacts to light later becomes fixed, a fatal outcome is to be expected in about 30 per cent of the cases.

In patients in whom the pupil remains contracted and fixed the mortality is about 70 per cent.

Decompression will reveal the injury on the same side as the affected pupil even though there be a homolateral hemiplegia. The possibility of bilateral injury or hemorrhage should, of course, not be overlooked.

The use of morphine or mydriatics in patients with recent head injuries obscures the pupillary signs and deprives the attending surgeon of valuable information.

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INFECTIOUS ERYTHEMA

A REPORT OF TEN CASES OBSERVED DURING AN EPIDEMIC OF MEASLES IN NORTH SAINT PAUL, MINNESOTA

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BETWEEN March 8, 1933, and May 30, 1933, there occurred in the village of North Saint Paul, Ramsey County, an epidemic of measles numbering about 100 cases.

At the same time there were seen ten cases of an eruption which, at first sight, suggested measles or scarlet fever, but which, on close examination, proved to be neither.

In thirty years' experience with contagious diseases the writer had never seen anything like this condition, or, if he had, had failed to recognize it. Two of the cases occurred during the Easter vacation, and were reported by the mothers. The others were picked up in school where a daily inspection of the children in the lower grades of both the public and parochial schools was made either by the county nurse, the teachers, or myself. The purpose of this examination was to limit, if possible, the spread of the measles epidemic.

Of the ten cases only one was in the parochial school. There were four grades represented in the public school, and one, the sixth, in the parochial. The public school grades involved were the first with one case, the second with two cases, the third with three cases, the sixth with one case, and the seventh with two cases. There were four males and six females. The ages ran from six to fifteen years, with an average age of 10.1. Apparently there was no connection between any of the cases, nor was there more than one case in any family.

The accompanying chart gives all these details and some others. The fact that several erupted on

Case	Age	Sex	Grade	Church	Date of eruption	Duration in days	History of exposure	Prodromal symptoms	Subjective symptoms	Nature of rash	Area of distribution	Measles	Scarlet fever
1. A. S.	9	F	3	Naz.	4-6-33	3	0	0	0	Scarlat.	Trunk and extremities	X	X
2. W. H.	8	M	2	0	4-11-33	3	0	0	I. B.	Scarlat.	Lower half abdomen and back. Scapular	X	0
3. L. S.	11	F	6	Pres.	4-17-33	2	0	0	I. B.	Mixed	Upper and lower extremities	X	X
4. G. Z.	9	M	3	G. Luth.	4-18-33	1	0	0	I.	Discrete	Both legs	X	0
5. D. K.	6	F	1	E. Luth.	5-14-33	7	0	0	I. B.	Mixed	Both upper extremities	0	0
6. C. S.	15	M	6	R. C.	5-15-33	3	0	0	0	Mostly Discrete	Right upper extremity	X	X
7. C. S.	9	F	3	G. Luth.	5-16-33	2	0	0	I.	Mixed	Both upper extremities	X	0
8. L. M.	13	F	7	Pres.	5-16-33	5	0	0	I. B.	Mixed	Both upper extremities	XX	0
9. G. B.	13	F	7	Pres.	5-16-33	3	0	0	B.	Mixed	Upper and lower extremities	X	X
10. R. S.	8	M	2	G. Luth.	5-17-33	7	0	Pain in stomach	B.	Mixed	Both upper extremities	0	X

Note: Under subjective symptoms I indicates itching; B, burning.

or about the same time might point to a common source of infection but neither an examination of the grade or of the church affiliation sheds any light on this point. Of the ten children, seven had had measles (one twice) and one developed them later. Five of the ten had had scarlet fever.

The rash was macular in nature, of a color varying from different shades of red up to a violaceous hue. It was partly discrete, partly confluent; in some cases there were areas of solid color, and, in others, a peculiar lace-like arrangement. At times, it was distinctly morbilliform in character, and again scarlatiniform. In most cases, a casual glance suggested measles so strongly that the mothers of the patients almost always thought it *was* measles. As I said before, there were areas, in some cases, that suggested scarlet fever, and in one case, number one of the series, I was sorely tempted to class it as such notwithstanding the fact that all the so-called classical symptoms were absent, and the child had had the disease only a few months before.

The duration of the rash was generally short. It varied from one to seven days, with an average of 3.6 days. Occasionally, it would disappear only to show up again under the influence of heat, or the friction of the clothing, etc. In one case, there was slight edema of the legs. There was no staining of the skin as is seen so frequently in measles during the convalescent stage, nor was there any desquamation, as far as my observation went.

The distribution of the rash was usually bilateral and symmetrical. In some cases the upper extremities were the only parts involved; in others, the upper and lower extremities. In one case, the legs alone were involved; in another, one arm only. In another case, the eruption was general except for the face. There was one case where the eruption was confined to the lower half of the abdomen and back, and to the scapular region on both sides. *In no case was the face involved.* The most significant things in connection with this condition were the almost total absence of prodromal symptoms, the lack of associated symptoms of any moment, and the evanescent character of the rash. There was no case

of fever, sore throat, vomiting, enlarged glands, coryza, cough, or Koplik's spots. In one instance, Case 10, there was a slight gastric disturbance four days before the appearance of the rash, but I am not at all sure it had anything to do with the disease; in fact, I think it very unlikely. The same child showed a slight injection of the conjunctiva. Subjective symptoms following the eruption of the rash were confined to itching and burning in three instances, itching alone in two, and burning alone in two, while two had no symptoms whatever.

Here, then, was a condition slightly resembling measles, and, to a much less extent, scarlet fever, but which was obviously neither.

What could it be? The answer is found, I believe, in *infectious erythema.*

In a paper of this kind it is neither necessary nor advisable to enter into the history of a disease or to review the literature that has sprung up regarding it. This has been done by others, and particularly, within the last few years, by Lawton and Smith of New Haven, Connecticut, in an article published in the *Archives of Internal Medicine* for January, 1931. They have given a sufficient, although not inclusive, bibliography. A recent article worth mentioning is that of Coe and Kelly in the January, 1932, issue of *California and Western Medicine,* reporting an epidemic in Berkeley, California. There is a paucity of American reports of this disease which is due, I suppose, either to the fact that it is rare in the United States, or that it is unrecognized.

However, I am inserting what I may call the accepted high lights of this condition so that comparison and comment may be made thereon. The material I am using in the following paragraphs is taken from Feer's "Pediatrics." Any italics are mine.

1. It is a well defined infectious disease which runs its course without any serious disturbance of the general health.

2. Its most important symptom is a large macular and frequently confluent exanthem *covering the face* and the extensor surfaces of the limbs.

3. It resembles measles.

4. Sporadic cases occasionally appear and frequently fail of diagnosis.

5. It commonly occurs in small epidemics confined within an institution or a single school.

6. Spring is the season in which such outbreaks are usually seen.

7. *They are said to occur coincidentally with measles and rubella.*

8. Most cases are in children; the oldest person observed was twenty years of age.

9. The method of contagion is not definitely known.

10. Direct transmission seems infrequent although it has certainly been noted.

11. The period of incubation varies from seven to fourteen days.

12. Restlessness, general malaise and slight sore throat *may* precede the eruption, but are usually absent.

13. The rash is usually the first sign and *appears first and more distinctly on the face* and the extremities. On the cheeks, large bright red and markedly raised spots resembling variola are seen. These enlarge and rapidly become confluent. The cheeks are markedly congested, very red, hot, and infiltrated. The region about the nose and mouth is frequently clear, but the forehead is usually involved. Upon the chin and about the ears there is a characteristic demarcation between the normal skin and the irregularly raised edges of the exanthem.

14. Besides the face, the extensor surfaces of the upper extremities are most frequently and markedly involved. The rash is also definite over the buttocks ands legs where the selection of the extensor over the flexor surfaces is not so great.

15. The eruption is usually bilaterally symmetrical.

16. The trunk usually remains free.

17. The rash sometimes takes on a cyanotic or brownish tint. It usually disappears rapidly and occasionally leaves a slight pigmentation. There is no distinct desquamation.

18. The eruption usually lasts about a week.

19. There is no record of any complication.

20. Koplik spots are never seen in this condition.

There is a very substantial accord between Feer's description of the disease and the symptoms observed in my cases. However, there is one very marked difference, and that is in regard to the eruption on the face. Feer, and others, regard this as almost a *sine qua non,* but, in my cases, it was entirely absent. Occasionally a writer says that there *may* be an eruption on the face, but most reporters insist on it as essential.

As to the preference of the rash for extensor surfaces, my experience agrees with that of others. The fact that this disease appears coincidentally with measles seems to me to be rather significant, and suggests a relationship comparable to that now known to exist between herpes zoster and chickenpox. Herpes zoster had been known for 5,000 years before it was dis-

covered that under certain conditions it was capable of producing chickenpox.

It is within the range of possibility that some day we shall have reason to believe that measles gives us infectious erythema.

SUMMARY

A series of ten cases of infectious erythema is reported.

These cases occurred during an epidemic of measles.

It is suggested that infectious erythema may bear more than a casual relationship to measles, possibly an analogous one to the relationship between herpes zoster and chickenpox.

It is believed that this is the first time infectious erythema has been reported in Minnesota.

SEPTICEMIA FOLLOWING OPERATION: REPORT OF TWO CASES

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BECAUSE of interesting and varying features, a comparison is presented of the etiologic factors, clinical course, and outcome in two cases of infection of the blood stream. In one of the cases the septicemia (hemolytic streptococcus) developed apparently on the basis of severe thrombophlebitis following vaginal hysterectomy; symptoms appeared nine days after operation. In the other case severe cystitis and infection of the blood stream with Aërobacter aërogenes, an organism closely associated with the colon bacillus, followed total abdominal hysterectomy; symptoms appeared twelve days after operation.

In the literature, a far greater number of infections of the blood stream is credited to streptococci and staphylococci than to the colon group of organisms. However, as stated by Cabot and Crabtree, the colon bacillus is probably present in the blood stream more commonly than is suspected. The clinical course of septicemia is much the same, no matter what the infecting organism may be. An irregular, "septic" type of temperature, frequently with chills, is the outstanding clinical sign. When death occurs, the terminal temperature is usually very high. If the patient recovers, the daily peaks in the record of temperature become gradually lower, and finally the temperature returns to normal. Septicemia caused by any organism should be looked on as serious, but determination of the type of infecting organism may have some prognostic significance. According to Jacob, the highest mortality rate from septicemia occurs in cases caused by staphylococci (88.2 per cent) whereas the lowest mortality rate is noted in cases of generalized sepsis caused by colon bacilli (40 per cent). The low mortality rate probably also holds for infections with Aërobacter aërogenes. A very serious type of infection, not mentioned by Jacob, and fortunately not frequently observed, is that due to Bacteroides, a Gram-negative anaërobic organism which appears late in cultures. Infection with this organism causes death in practically all cases. Metastatic foci of infection do not occur frequently in streptococcic infections and very rarely in infections with colon bacilli.

In most clinical reports of septicemia caused by colon bacilli the closely related organism, Aërobacter aërogenes is not mentioned. Nevertheless, probably some of the infections described have been caused by the latter organism, since it is present in a large percentage of the feces of man.

The treatment of septicemia has changed within the last two decades. In addition to the usual strict regimen of rest in bed with administration of plenty of fluids, specific vaccine has been administered; transfusions of blood have been given, and various dyes or chemicals have been injected intravenously, with a view to sterilizing the blood stream.

REPORTS OF CASES

Case 1.—A married woman, aged thirty-eight years came to the clinic August 19, 1932. She related that her father had died of carcinoma of the liver. She had divorced her first husband in 1918 after discovering that he had syphilis, and had married again in 1924. She had never been pregnant. Menstruation always had

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been normal. She complained of pruritus, paresthesia affecting the hands and feet, and unstable gait; these symptoms had been very troublesome since July. Her trouble dated back to 1924, when she had been operated on elsewhere because of pains in the legs. At that time, the right ovary was said to be diseased and was removed, together with the appendix. During a stormy convalescence, a positive Wassermann test was obtained (4+) and specific treatment was given. In 1928, treatment for syphilis was again given, because of return of the pains in the legs. In January, 1932, nervous symptoms began and gradually progressed, and in July, 1932, paralysis appeared, and endured for five days.

The patient's gait was unstable, and she walked with her feet wide apart. The Romberg sign and Argyll-Robertson pupils were present. The right patellar reflex was absent and Achilles tendon reflexes were absent bilaterally. Astereognosis was present. Examination of the pelvis revealed a large cystic mass on the right side. The blood pressure was 90 systolic and 80 diastolic in millimeters of mercury. The value for hemoglobin was 13.7 gm. in each 100 c.c. of blood. Leukocytes numbered 16,300 in each cubic millimeter of blood and the proportion of polymorphonuclears was 73 per cent. The Kline and Kahn tests on the blood were graded 1+, and the Kolmer modification of the Wassermann reaction, applied to the cerebrospinal fluid, was reported as 4+, 4+, 4+ and 1+. A catheterized specimen of urine was acid in reaction, contained hyaline casts graded 1, but neither albumin nor sugar. The patient was placed in hospital and antisyphilitic treatment was begun.

September 14, right oöphorectomy, total abdominal hysterectomy and left salpingectomy were performed for right intraligamentous ovarian cyst, chronic cervicitis and endometritis. A great many adhesions were found throughout the pelvis, especially about the bladder, uterus and sigmoid. For the first twelve days after operation convalescence was uneventful. The patient had been up for one day when a septic type of temperature set in, accompanied by frequency of urination. A specimen of urine contained albumin graded 2 and pus graded 4. The number of leukocytes in each cubic millimeter of blood rose to 31,500 and the value for blood urea to 80 mg. in each 100 c.c. The temperature rose to 103° or 104° F. practically every day. Blood cultures made October 4 and October 6 contained Aërobacter aërogenes after four to seven days' growth. October 6, cystoscopic examination revealed that the walls of the bladder were coated with purulent exudate. Both ureters were catheterized, but no evidence of retention was found. Urine from the ureter on each side was clear.

Treatment consisted of rest in bed, forced intake of fluids, administration of urinary antiseptic substances, and the usual general measures. In addition to this, the bladder was irrigated with silver iodide and gentian violet three times daily on various occasions. An intravenous injection of 10 c.c. of 1 per cent solution of mercurochrome was given on one occasion, but, because of a severe reaction, was not repeated. Gentian violet, 80 c.c. of a 0.25 per cent solution (5 mg. per kg. of body weight) was given intravenously daily for one week. The temperature fell by lysis, remaining normal from the fortieth to forty-eighth day. On the forty-ninth day it again rose, reaching 102° F., but gradually dropped back to normal. The patient was dismissed from the hospital on the fifty-fifth postoperative day. The voided urine still contained pus, but the symptoms of cystitis were subsiding.

Case 2.—A married woman, Jewish, aged forty-six years, came to the clinic June 30, 1926. She had been married twenty years and had seven living children. Her family history revealed nothing of note. She came to the clinic because she felt weak and tired. Menses had been regular until four months before, when the flow had become scanty and the periods of flow had appeared at irregular intervals of two to three weeks; she noticed "spotting" between periods.

The patient was obese, and her heart was slightly enlarged. A small, umbilical hernia was present. Varicose veins were present along the course of the left internal saphenous vein. There was marked perineal laceration, uterine prolapse, rectocele, and cystocele. The uterine cervix was enlarged, cystic, lacerated, and the posterior lip was everted. The blood pressure was 130 systolic, and 88 diastolic in millimeters of mercury. The specific gravity of the urine was 1.031. Otherwise examination of urine and blood gave essentially negative results.

July 9, 1926, a Mayo vaginal hysterectomy and perineorrhaphy were done. For the first nine days after operation, without obvious cause, there was a moderate, sustained elevation of temperature. The highest temperature at this period was 102.5° F. On the tenth postoperative day the temperature suddenly rose to 103° then to 106° F. and the pulse rate to 112 each minute. Tenderness, indicative of thrombosis appeared along the left saphenous vein, accompanied by considerable induration and tenderness of the inguinal lymph nodes. Thrombi could not be palpated in the superficial varicosities of the leg. By the eleventh postoperative day the thrombotic process in the thigh had extended to the leg, and the temperature by rectum rose to 108.6° F. Leukocytes numbered 17,400 in each cubic millimeter of blood, and a chill occurred. For the next ten days the temperature by rectum varied from 100° to 109° F. and the pulse rate varied from 90 to 190 each minute. Blood culture was negative on the thirteenth postoperative day, but was positive for hemolytic streptococci on the fourteenth postoperative day.

Treatment consisted of elevation of the leg, application of ice packs, and the usual general measures. Intravenous injection of 10 c.c. of 1 per cent solution of mercurochrome was given on two successive days, without apparent benefit. Then 100 c.c. of 0.25 per cent solution of gentian violet (5 mg. per kg. of body weight) was given intravenously on two days, and later 10 c.c. and 20 c.c. amounts of 1 per cent mercurochrome. On the twentieth postoperative day, an area on the left thigh was fluctuant; this was incised and a large amount of foul pus escaped. In spite of all efforts, the patient's strength gradually failed and she

died on the twenty-second day after operation, with a temperature of 108° F. (Fig. 1).

COMMENT

The infecting organism and its site of entrance into the blood stream were entirely different in the two cases. In Case 1, separation of many old inflammatory adhesions no doubt caused some

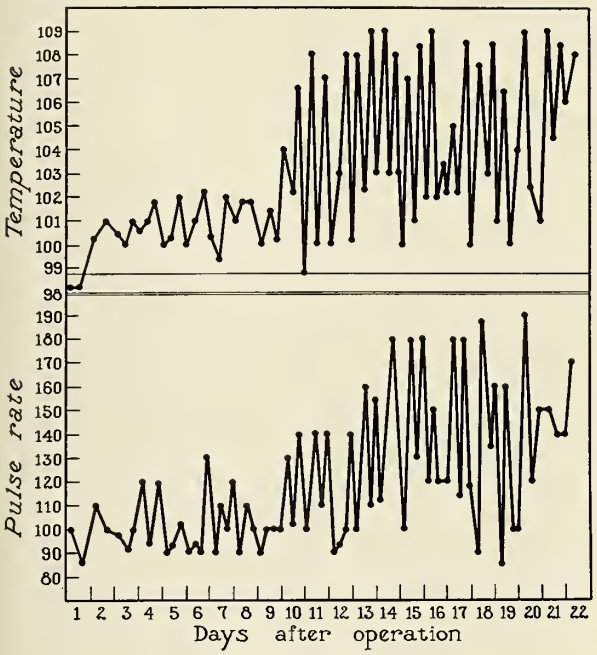


Fig. 1. Temperature and pulse rates.

trauma to the wall of the bladder, and prepared the soil for infection with an organism which presumably traveled there from the colon, by way of the lymphatic channels. However, a retention catheter had been placed in the bladder and was allowed to remain for the first ten days after operation. The colon bacillus has been found in the urethras of normal women. If the colon bacillus occurs on the normal urethral mucosa, presumably Aërobacter aërogenes also occurs there, and it is possible that the cystitis in Case 1 was initiated by the contamination and irritation caused by the catheter. Whatever the origin of the cystitis, since there was no pyelitis, as was shown by examination of urine obtained by ureteral catheter, the invasion of the blood stream doubtless originated in the bladder. Although the bladder itself is not a common site of origin of infection of the blood stream, Felty found that more than half of a series of twenty-eight cases of septicemia caused by colon bacilli arose from infection in the urinary tract. Jacob placed the urinary tract second in order of significance among portals of entry of colon bacilli in cases of septicemia; the gallbladder, he said, was the most common portal. Recently there has occurred at the clinic another case of infection of the blood stream with Aërobacter aërogenes in which the patient recovered following cholecystectomy.

In Case 2, the infecting organism can be assumed to have invaded the blood stream from the severe thrombophlebitic process of the left thigh and leg, since no other regions of inflammation were found on repeated physical examination. Septicemia following thrombophlebitis is relatively rare, but does occur. That a human being could withstand a temperature of 108° and 109° F. even for short periods at a time, for ten consecutive days, is almost unbelievable.

Whether any significance can be attached to the recovery of the patient in Case 1, following treatment with dyes, is questionable. Young and his colleagues have expressed the belief that intravenous injection of antiseptic substances is valuable. In another case of septicemia caused by Aërobacter aërogenes, recently seen at the clinic, the patient was given mercurochrome intravenously and recovered. The patient in our Case 1, whose infection was with the same organism, was treated, in the main, by intravenous injection of gentian violet, and also recovered.

SUMMARY

In a case of septicemia caused by Aërobacter aërogenes, the portal of entry was probably the bladder. In another case, caused by hemolytic streptococci, the infection probably arose in a severe thrombophlebitic process of the left thigh. The patient in Case 1 recovered, but the patient in Case 2, whose temperature reached extreme heights and whose pulse was at times extremely rapid, died.

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CASE REPORTS

TULAREMIA FOLLOWING WOOD-TICK BITE*

George Fahr, M.D.
Minneapolis

Medical students are very apt to think of tularemia as rabbit's disease. The case I am about to present will serve to remind you that the early work on tularemia was done on cases which were associated with the bites of insects and will tend to keep fresh in your minds the fact that the wood-ticks of Minnesota are badly infected with B. tularense and that cases of tularemia will be found in Minnesota from time to time associated with the bite of wood-ticks.

This patient, a man fifty-two years of age, came to the hospital on May 19, 1933, because he had been having a pain in the chest for some weeks past. He started to have a cough and bloody sputum two days before entrance. On entrance into the hospital, the patient was found to have a temperature of 103, respiration of from twenty-two to thirty-two per minute, a pulse rate of about 110, and pain in the chest. On percussion of the chest, the note appeared to be normal and on auscultation, the breath sounds and voice sounds seemed to be normal. There was no increase in tactile fremitus. Many crepitant râles and bubbling râles were heard at the left base and in the left axilla and a few crepitant râles were heard at the right base. There were no enlarged lymph glands palpated, but on the right arm near the axilla, there was one somewhat reddened, indurated area where the patient had been bitten by a wood-tick the day before and there was one wood-tick still adherent to the right arm near the axilla. This wood-tick was removed, but unfortunately was not sent over to Dr. Greene for culture. The white blood count was 7,200. A single film taken of the chest showed linear accentuation of both basilar trunks, more marked on the right side where the appearance indicated a pneumonic process, possibly in the state of resolution. A chest plate taken one week later showed "a bilateral bronchopneumonic process which appears to have increased slightly since the original study. This increase is in the left lower lobe. Conclusion: Bronchopneumonia, bilateral." A diagnosis of acute bronchitis with bronchopneumonia patches in both the left and right lower lobes was made. The patient's temperature remained around 103 for one week, after which it started to go down and was normal on the thirteenth day after admission to the hospital. During this period, a white count was taken on two other occasions. Five days after entrance into the hospital, it was 5,400 with a normal differential count and nine days after entrance into the hospital, it was 6,200. At no time was there any leukocytosis. At the end of two weeks, the bronchopneumonic process had almost completely cleared up. Temperature was normal and the pulse rate was about 80.

A skin consultation was obtained on May 30th, eleven days after admission to the hospital, which resulted in a consultation note that there were two infected bites on the right arm and that calomine lotion should be applied.. Thirty-one days after entrance to the hospital, the intern noticed for the first time a fairly large mass in the right axilla which was tender and rather soft and which was undoubtedly a packet of swollen glands. The intern is certain that the enlargement of the glands could only have been present for a very few days. Throughout the following week, the glands enlarged and seemed to soften and become adherent to the skin. A few days before the interne noted the enlarged lymph glands in the right axilla, the temperature had started to rise and at the time the glands were noted, the temperature had gone up to 100° and the leukocyte count to 10,600.

About June 26th, about one week after the enlarged lymph had been noted by the interne, I was shown the case for the first time. By this time, there were evidences of two reddened, indurated areas, each about one centimeter in diameter, on the right arm near the axilla with evidences of bites in their centers. You may still see these two raised, reddened areas with a black spot the size of a pinhead in the center of each indurated area. In the right axilla, there was a large packet of swollen tender lymph glands which appeared somewhat softened in their center and were apparently attached to the skin. At this time, the temperature was between 100 and 101. There was a moderate leukocytosis and having heard the history of wood-tick bites and the removal of wood-tick previously, I made the probable diagnosis of tularemia and asked that blood be sent to three different laboratories for agglutination and that the skin test devised by Dr. Robert Greene be used immediately after taking blood for the agglutination tests. The diagnosis of tularemia came very easily because just one day before I saw this patient for the first time, I was visiting Dr. Robert Greene at his experimental station on Lake Alexander and had been informed by him that 10 per cent of the wood-ticks in that neighborhood were carrying B. tularense.

Tularemia antigen (0.01 c.c.) was injected into the left arm of the patient and two days later there was a red and indurated area about the site of injection, of a diameter of about 1 cm. A few days later, Dr. Greene's laboratory returned the report on the agglutination test for B. tularense. The agglutination was positive in a dilution of 1:1280. The State Board laboratory returned the report "agglutination present in a

*Clinic for Seniors at the Minneapolis General Hospital.

dilution of 1:1280 when tested with *bacterium tularense* antigen." The hospital laboratory found the agglutination for *bacterium tularense* antigen positive up to dilution of 1:200. No higher dilutions were attempted.

Four weeks after the enlarged lymph node was first noticed, a biopsy was done on the enlarged glands. A portion of the biopsied gland was injected into two guinea pigs by Dr. Byron Olson of the Department of Bacteriology at the University. Four days later the guinea pigs died and were autopsied. These livers and spleens showed the characteristic nodules of tularemia.

The second rise of temperature in this patient remained above the normal for two weeks, after which it became normal to sub-febrile. The patient felt somewhat tired and weak all this time, but was able to be up and about seven weeks after entering the hospital. As you see him now, he looks perfectly well. He states that he feels well excepting that he tires somewhat more easily than previous to his illness. He is ready for discharge after this clinic.

When we consider that the enlarged glands in the axilla developed approximately three weeks after known tick bites, that there was associated with this a secondary rise in temperature and that the glands contained B. tularense, I think there can be no question but that the tick bites sustained on May 18th were the cause of the tularemia and the glandular enlargement in the right axilla. Certainly this case is one to warn us that this year and next year, we will probably be seeing cases of tularemia due to bites from wood-ticks infected with tularemia. Dr. Greene's investigation of the infection in the wood-ticks about Lake Alexander shows that almost 10 per cent of the wood-ticks in this area harbor B. tularense. It is very probable that the incidence of infection in other parts of the state is not so high, but when we consider that tularemia in rabbits is spread all over the state, it is very probable that there are wood-ticks in all parts of the state of Minnesota which harbor B. tularense and from time to time, cases of tularemia will develop which are due to wood-tick bites. The ticks in this case were obtained along the Mississippi river banks near the east side of this city where many of the homeless men are camped. In every case of fever of unknown origin, careful search should be made for evidence of infection with tularemia and for evidences of tick-bite preceding the onset of the fever. Moreover, one should be very careful to avoid being bitten by ticks and to remove them as fast as possible when bitten. The more tick bites, the greater the number of *bacterium tularense* that are inoculated into a patient. One or two infected wood-ticks probably would produce a mild degree of tularemia; a large number would produce a severe illness. You will note that this patient was not severely ill, though many patients suffering from tularemia are very severely ill. Moreover, the temperature was elevated only for two weeks. I assume that the two wood-ticks harbored only a comparatively few B. tularense, and that, therefore, the infection was very mild. You must be on the lookout for these mild cases during the wood-tick season.

AMIDOPYRINE IN DIABETES INSIPIDUS

John M. Culligan, M.D., and
Harold J. Prendergast, M.D.
Saint Paul

On April 1, 1933, a patient suffering from diabetes insipidus came under our observation. He was a white male thirty years of age and a farmer by occupation.

The man's father had died at the age of eighty from gallstone complications. His mother was living and well. Married five months, his wife was living and well.

The patient had had a cyst excised from his lip several years previous. Other than this he had never been ill.

On March 1, 1933, the patient noticed that his mouth had become very dry and that he had developed an unquenchable thirst. As a result of this he drank large quantities of water and passed very large amounts of urine. His bladder would become full at least once every hour, which necessitated his arising at night from five to eight times. He gave no history of craving sweets. He had lost twelve pounds in weight during March. His history otherwise was negative.

Following his first visit to the office he voided eighteen quarts of urine in the following twenty-four hours.

Physical examination was entirely negative except for a slight infection of his tonsils. His blood pressure was 120/70, pulse rate 75, temperature 98 degrees.

Urinalysis revealed a very pale watery colored urine with a specific gravity of 1.000. There was no albumin, sugar or sediment present. His hemoglobin was 75 per cent, white blood count 8,350. The blood Wassermann test was negative. Blood sugar amounted to 15 milligrams per 100 c.c. of blood. A roentgenogram of the skull revealed a normal sella turcica. His nasopharynx and eye grounds were entirely normal.

A diagnosis of diabetes insipidus was made, and the patient was placed upon one c.c. hypodermic injections of surgical pituitrin. He usually took the injection before retiring and had relief from his symptoms until about noon the next day. At that time his frequency of urination and thirst would return but could be controlled by another hypodermic. Because of his aversion to the injections he would not take another until evening. He continued on this treatment for about two weeks. He then attempted using obstetrical pituitrin because it was cheaper. However, this did not control his symptoms. He returned to the use of surgical pituitrin once each evening until about June 1, 1933, when he appeared at the office bringing the *Journal of the American Medical Association* of May 20, 1933, in which a case of diabetes insipidus was reported by Kahn of New York which had been successfully treated by amidopyrine. Kahn, following the suggestion of Scherf, was able to obtain relief for his patient for a period of about four days, when the effects of the drug would wear off and he would have to take an injection of pituitrin. Then he could obtain relief again for a period of about four days by the use of amidopyrine.

In an attempt to relieve our patient from the necessity of taking daily hypodermics of pituitrin, we placed him upon amidopyrine, one gram before retiring each night. He was entirely relieved of his symptoms, and continued symptom free for six days. On the sixth day the effect of the amidopyrine began to disappear. Subsequent administrations of the drug failed to produce any effect. If, however, he took a hypodermic injection of one c.c. of surgical pituitrin, the amidopyrine would regain its lost effect, and he would obtain relief of his symptoms for a period of another six days by taking one grain of amidopyrine each night. Then another hypodermic of pituitrin was necessary to apparently reactivate the amidopyrine. By continuing this cycle of amidopyrine daily and pituitrin every six days he has remained symptom free. He has regained his lost weight and feels as well as ever. The specific gravity of his urine has increased to 1.014. The relief from taking daily hypodermics is very gratifying to the patient.

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President's Letter

I WANT to take this opportunity to congratulate the officers, committees and members of the Northern Minnesota Medical Association on the splendid meeting held last month in Willmar. The attendance was excellent and the program very fine.

The sectional meetings are of great value and should be continued purely on the basis of the presentation of a scientific program. This should be true of all societies outside of the regularly organized county medical societies, the State Medical Association and the American Medical Association.

If a concerted and uniform program pertaining to policies of general medical practice and medical economics is to be formulated and carried through, it should be done through the regularly organized medical societies.

Yours very truly,



President,
Minnesota State Medical Association.

EDITORIAL

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THE CANCER COMMITTEE REPORT

In our July number we made editorial mention of the report of the Cancer Survey of Minnesota, by Dr. Frank Leslie Rector of the American Society for the Control of Cancer. Copies of the report are very limited and as a result it is not possible for the profession of the state to become familiar with the complete report. The report of our Cancer Committee before the House of Delegates, however, included in its report the recommendations made by Dr. Rector, and these recommendations appear in the proceedings in this issue. The cancer problem is one of the major subjects challenging the attention of the profession and each member would do well to read carefully the recommendations with the idea of each doing his part in combatting this scourge.

CANCER CURES

In no way is the saying of the late P. T. Barnum that the American public likes to be fooled, better illustrated than by the gullibility of the public in regard to cancer cures. And yet cancer sufferers, like drowning victims snatching at a straw, are to be pitied rather than censured. Certainly they are entitled to authentic information regarding advertised cancer cures. And the medical profession is furnishing just this. Our national organization maintains a Bureau of Investigation, one of the duties of which is to furnish, gratis, information about cancer cures. Publicity should be given to the fact that anyone may write to this Bureau of the American Medical Association headquarters and obtain unbiased information on proposed cures.

Weekly the Bureau receives letters stating that the writer has a sure cancer cure. Some of these writers are apparently sincere, while others obviously have commercial designs. The writer is asked to fulfill the following requirements before his "cure" can be investigated:

1.—Send in a complete statement of the composition of the remedy, including not only the name but the quantity of each ingredient for which therapeutic action is claimed. It is made clear that such information, if sent to the American Medical Association, will not be accepted in confidence, but will become part of the Association's records, to be passed on to those who may inquire about the product.

2.—Send in the names and addresses of at least twenty-five persons who are claimed to have been cured of cancer by the product in question.

3.—Send in the names and addresses of the physicians who diagnosed these cases as those of cancer.

It is interesting to note that so far these perfectly fair requirements have not been complied with in a single instance.

Occasionally, a physician believes he has found a new method of treating cancer. The announcement causes quite a flurry in medical circles and disillusionment follows. The above requirements of the Bureau might well be demanded before such discoveries are given general trial. This is not to be interpreted as disparaging further attempts on the part of physicians to find new and better methods than we have today of treating this scourge—cancer.

A little pamphlet recently published by the Bureau entitled, "Cancer Cures and Treatments," contains a description of various "cures" and is

interesting and educational. As mentioned in the pamphlet, a cancer patient will just as surely die if treated by the honest but misguided enthusiast as by the out-and-out swindler.

APPENDICITIS MORTALITY

Recently we had occasion to read a statistical survey of the mortality from appendicitis in the United States and Canada.* During the past two decades the mortality rate for sixty cities in this country ranged from 13 to 18 per 100,000 population. The peak was reached in 1929 and 1930, and since then there has been a slight downward trend to the figure of 15.7 in 1932.

Far be it from us to draw any conclusions from the figures presented. Statistics are treacherous even in the expert statistician's hands and the author of the mentioned survey is content simply to give the figures and imply that something should be done about the matter.

There is little in the statistics to indicate that the considerable variation in mortality rates for the various cities corresponds either to the enlightenment of the population in general or the erudition of the local medical profession. The rates for Canada and the United States the past two years are approximately the same

Every physician knows the treacherous nature of appendicitis. Early diagnosis and prompt operation are generally recognized as the best treatment. And yet there are a great many factors which militate against this method of handling. So many attacks of appendicitis are ushered in with atypical symptoms that even the attending physician is, sometimes, misled. Is it any wonder that the patient sometimes thinks he has an old-fashioned stomach ache, takes a cathartic and postpones calling the physician, especially nowadays when the exchequer is so generally low?

Ever since appendicitis came to be recognized as an entity, the subject has received considerable attention in medical literature. There has been considerable difference of opinion expressed, off and on, as to the best method of treating an attack of appendictis, but this has crystalized in the generally accepted procedure of early diagnosis and operative removal. The patient seen or diagnosed after the infection has had one or two days to gain headway is the one likely to die with or without operation. Such a patient becomes an individual problem and in such a case there is room for a difference of opinion as to the best procedure. Here is a real test of the surgeon's ability. This is the type of case that must receive the intensive study of the surgeons if the mortality from appendicitis is to be reduced.

Hoffman, Frederick L.: The appendicitis record for 1932. The Spectator, August 3, 1933.

SCHOOLS FOR MEDICAL TECHNICIANS

One of the activities of the Minnesota State Medical Society is vested in the Committee on Schools for Medical Technicians. Having been a member of this committee ever since its organization, and most of that time its chairman, perhaps the writer may be permitted to comment on its work and the reasons for its creation.

Some years ago it was realized that the registration of all laboratory technicians and assistants employed or seeking employment was a very important if not an imperative matter. This work is now being carried on by the Board of Registry of the American Society of Clinical Pathologists. Equally as important was the registration and standardization of all those institutions which claimed to be giving courses in medical technology.

These institutions are readily placed into one of three groups. In the first group, and standing alone, is the Medical Department of the State University which offers a three-year course arranged to fit the needs of its graduate nurses. It is plain to be seen that "few can enter here."

A second group includes the commercial institutions which present a real problem because of their rather high tuition fees, their uncertain course and instruction and, in many instances, their dearth of laboratory material because of their non-association in any intimate way with any hospitals.

The third group, to which we wish, particularly to call the reader's attention, comprise those first class and reputable hospitals of the Twin Cities which give reliable and commendable instruction in their laboratory departments.

Many of the readers of MINNESOTA MEDICINE —mostly physicians in the active practice of medicine—must, at some time or other, have been interrogated as to where a reliable course in medical technology can be obtained. So it is with a great deal of satisfaction that we call the attention to an advertisement on page 554 of our August issue, inserted by the Ancker Hospital of Saint Paul, offering a course for laboratory technicians. Similar courses are given at the Miller Hospital, Saint Paul, and the General Hospital, and the Swedish Hospital in Minneapolis.

This is the first time that MINNESOTA MEDICINE has had the opportunity to display such an advertisement and it serves as an excellent "hook-up" between the institutions giving these courses, the readers of this journal and those seeking such a training. It is to be hoped that our readers will keep this in mind, feeling assured that any person seeking a course in medical technology and referred to one of the above institutions, will receive wise counsel.

A. G. S.

EDUCATION OF THE DEAF

Several methods are used in educating the deaf: the manual method, which employs finger spelling, signs, or both; the oral method by which the child is taught to speak and read the lips; and the aural method which utilizes any residuum of hearing a child may have. The oral and manual methods are sometimes combined, and the aural method is rarely used independently of the oral method.

Many persons speak of the manual method as the old method and the oral method as the new. In reality this is not correct, for records tell us that as early as the year 691 the deaf were taught to speak. The manual method was the first to make its appearance in this country, however. Back in the early days a young theological student by the name of Gallaudet became interested in the deaf of America and went to Europe looking for help. First he went to England when the oral method was used, but found the schools there closed to him. He then went on to France and there received what they had to give, the manual method. With this information he returned to the United States and began his work. It was not until some time later that the oral method was used here.

The manual method enables a deaf person to associate and communicate freely with other deaf people, and with hearing people by means of pencil and paper. The combined method (oral and manual) often produces results differing little from the manual alone, for signs, being the line of least resistance, are generally used. The oral, or better still oral and aural method, has as its goal the fitting of the deaf child for association with the world at large.

All oral work is not good oral work, I am sorry to say, but if a child is taken early enough (at three or four), placed in classes small enough (not more than five or six pupils), and taught by a well trained teacher who loves her work and has the wholehearted coöperation of the child's family, that child can be made to compare favorably with his hearing brothers and sisters. I should like to mention a few examples to prove my point: D., aged fourteen, an honor student in the freshman class at the University of Chicago High School; M., aged sixteen, a senior in good standing in a large public high school in Los Angeles; J., aged twenty-three, last year Ph. B., University of Chicago, this year M. A., Harvard University.

Are not these results worth striving for?

FLORENCE WARNER,
Senior Teacher Central Institute for the Deaf, St. Louis, Missouri.

OBITUARY

Dr. Mason Allen

1872-1933

Dr. Mason Allen, physician in Saint Paul for thirty-six years, died Thursday, August 31, 1933, at the age of sixty years, after an illness of several months.

Born in Grafton, Illinois, October 29, 1872, Dr. Allen came to Saint Paul in 1891 and entered the medical school at the University of Minnesota, from which he was graduated in 1897. Following his graduation he opened offices in St. Paul where he had practiced until ill health forced him to retire eight months ago. He was married in 1900 to Clara F. King of Saint Paul. His office was at 214 Lowry building prior to his retirement and he was a member of the Ramsey County Medical Society, the Minnesota State Medical Association and the American Medical Association.

Surviving him are his widow, three sons, Mason E of St. Paul, Dr. Philip K. of San Diego, Calif., and Stuart Allen of Tientsin, China; two daughters, Mrs. Truman C. Penney of Minneapolis and Mrs. George H. McCabe of Duluth; two sisters, Mrs. Leila A. Benepe of Saint Paul and Mrs. Catherine A. Toribio of Pasadena, Calif., and two brothers, Dr. Arthur B., and Robert S. Allen of Pasadena.

Dr. James McKeon

1861-1933

Dr. James McKeon was born in Jassenland, Minnesota, November 10, 1861. He died July 5, 1933, at the home of his son, Dr. J. O. McKeon, in Montgomery, Minnesota, at the age of seventy-one.

Dr. McKeon began the study of medicine at the Physicians and Surgeons College in Minneapolis. After completing the course in 1889 he went to New York City, where he took advanced work at the Bellevue Medical College.

In 1890, Dr. McKeon located in Montgomery, where he continued to practice until September, 1920, when he moved to Saint Paul and opened offices in the Lowry Building. Three years ago he suffered a heart attack, after which his health declined.

He was married in 1891 to Bozena Hanak. In 1895, with his wife and his two sons, he went to Europe and spent a year in postgraduate work in Vienna and other medical centers in Germany.

During the thirty-three years that he practiced in Montgomery, Dr. McKeon served as chairman of the Board of Health, president of the Board of Education, county chairman of the Red Cross, and as chairman of the "four-minute men" during the World War. He was active in the Knights of Columbus, the Ancient Order of Hibernians, and the Catholic Order of Foresters. He was a member of the Scott-Carver County Medical Society, Minnesota State Medical Association and the Southern Minnesota Medical Association.

Dr. McKeon is survived by his wife; four daughters, Mrs. Donald J. Lucas, Minneapolis; Mrs. A. G. Scheidel, Mankato; Mrs. J. E. Grathwol, Perham, and Mrs. David V. Stout, San Jose, California; two sons, Dr. J. O. McKeon, Montgomery, and George J. McKeon, New York City; and three brothers, Dr. Phillip McKeon, New Richmond, Wisconsin; Dr. Owen McKeon, Saint Paul, and Patrick McKeon, Ellsworth, Wisconsin.

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

"Socialism at Our Doorstep"

DISCUSSION among medical men concerning the effect of the National Industrial Recovery Act in their own offices and hospital connections has been interested and general but quite vague. The codes currently worked out for them have been equally vague. That is to be expected, of course, considering the special nature of the service demanded of physicians and hospitals.

Other aspects of NRA may concern physicians much more definitely, according to an editorial by H. Sheridan Baketel, in a recent issue of *Medical Economics*. This interesting editorial, reprinted below, calls pointed attention to possible end results of the social and economic revolution of today which will challenge the wisdom and discipline and perseverance of the medical profession.

"Medical men want to pause and think carefully regarding the ultimate effect of the National Industrial Recovery Act upon their lives and careers. When the Act was passed in Washington two months ago, President Roosevelt called it 'the most important piece of legislation ever passed by the American Congress.'

"Learned men tell us that the Recovery Act is a long step toward socialism . . . that it greatly modifies the old law of 'the survival of the fittest' as applied to American commerce and industry . . . that it gives a new strength to the old principle that the welfare of the nation is more to be regarded than the rights of the individual.

"They tell us that the Recovery Act makes unrestrained competition a thing of the past. From now on Government will begin to dictate with a growing voice. Government doesn't want business running itself to death in a free-for-all race toward Heaven-knows-what, with all the consequent waste, bankruptcy, unemployment, and general misery which it has been our doubtful privilege to enjoy these last three years.

"The new legislation gives Government the power to form the race into an orderly procession toward a common goal.

"The immediate effect of all this on the physician will, of course, be the same as on the people at large. As prosperity returns, the doctor will share in its benefits. As security prices continue to rise, we may expect to recoup at least a portion of our 1929 losses. All this is obvious.

"Less obvious is the fact that if Government can give itself the power to dictate to business, it can give itself the power to dictate to medicine.

"Most physicians feel that this power is already being exercised—a feeling which is partially justified, to be sure. But it needs no prophet to point out that dictatorship *could* be applied far more sternly. The most pessimistic of us must realize that the practice of medicine in America is controlled by a rein, which, by comparison at least, is a loose one. *We are still a privileged profession.*

"It behooves organized medicine to use all its foresight to see that we remain a privileged profession. It is not enough for organized medicine to set up a code of ethics and endeavor to enforce it. There must be some *economic* control. There must be measures to reduce waste, inefficiency, and dissatisfaction among both doctors and patients, and to create a higher level of efficiency and prosperity within the profession itself. This, in broad terms, is the lesson taught us by the application of the Recovery Act.

"Specifically how to accomplish these desiderata is a problem that deserves thorough and skillful study. Subjects that should be considered include:

"1. Regulating the number of new doctors.

"2. Making the standards of specialism more definite, more uniform.

"3. Agreeing upon a national uniform system of fees, scaled according to locality and presumed degree of skill.

"4. Drastic action on the charity problem, leading to a fair apportionment of the charity load.

"These four topics will do as a start. If they can be solved, and the solution made a permanent part of organized medicine's control, it will be proved that medicine knows enough about self-discipline to merit the high privilege given it. But if action along these lines is too slow in coming, we will undoubtedly awake some morning to find socialism right in our laps—for it is already at our doorstep."

Rating Incomes

A Medical Budget Board organized in each community to collect savings to be used for doctor, medicine, dentist, nurse, hospital, prescription druggist, old age care and burial is urged in a recent issue of the *Journal of the Iowa State Medical Society* by G. Hubert Artis. Doctors' bills are then to be paid from these medical savings or from cash on the counter—and the doctors are to demand such payment. Special ratings according to income are to determine the size of the amount paid by each patient. The following method of rating is suggested.

Let the upper figure of the factor represent one-tenth of one per cent of the annual net income from all sources. Let the lower figure represent the number of dependents, as three, five or nine.

The factors can then be made up from the following, as:

$ .312/1 = .3
1.000/6 = .16
2.000/4 = .5
3.000/3 = 1.
5.000/2 = 2.5
10.000/2 = 5.

Now multiply the factor by the regular charge, $2.00 for an office call.

$2.00 × .3 = $ 0.60
2.00 × .16 = 0.32
2.00 × .6 = 1.00
2.00 × 1. = 2.00
2.00 × 2.5 = 5.00
2.00 × 5. = 10.00

The last figures are what an ordinary office call would look like when worked upon by the factors.

Dr. Artis' rating method is an interesting example of many such plans that are being suggested on all hands for solution of the economic problems of the profession. They demand the careful consideration of every well informed medical man.

PUBLIC HEALTH SERVICE

"Communities cannot afford to play fast and loose with their sanitary and health services. If they do, they may well run into difficulties fully as serious as the depression itself," said Dr. Louis I. Dublin, vice president of the Metropolitan Life Insurance Company and past president of the American Public Health Association, in a recent address on the National Farm and Home Hour over the National Broadcasting System. "Just before the depression set in, the country as a whole was investing about 120 millions of dollars a year for the preservation of the public health. This was equivalent to about $1 for each man, woman and child. The dollar covered the work of all agencies, whether of the Federal Government, the States, the counties or the municipalities and included the work of public as well as of private organizations. This amount, moreover, accomplished a fairly good job. It protected the community from contagion; safeguarded our water and food supplies; instructed mothers in the care of their children; provided for the medical inspection and health education of our children in the schools; supervised our cases of tuberculosis and managed a host of other activities which have become a part of the modern public health program. We could have done much more for the benefit of the people with $2 per capita than with $1. Such cities as Detroit, New Haven, Syracuse, and a number of others did actually spend $2 and more and profited accordingly from their farsightedness. On the other hand large areas, especially in the rural sections of the country, spent very little, often only a few pennies per capita.

"With the beginning of the depression cuts in budgets began until I estimate now that there has been altogether a reduction of about 20 per cent.

"The amount of budget cutting has varied considerably from place to place. New York State fortunately has maintained its service practically intact. The Governor has made it known that he will not permit this important social service to be impaired. Other states have not been quite so fortunate either in their financial resources or in the public spirit and vision of their executives. A number of them have cut their health budgets from 30 to 50 and more per cent. Thus, the State of Mississippi, which in 1931 spent $526,394 for its state health service, was compelled to reduce its budget to $130,000 in 1933. A similar picture can be drawn for a number of other places. The southern states have as a group been particularly hard hit with the result that large numbers of their professional personnel have been released, including physicians, nurses and other sanitary officers. Many County Health Units in these states have either been altogether eliminated for the lack of resources or have had their personnel reduced to the barest minimum. The few years of the depression have in large measure undone the work built up to safeguard the public health during the last fifteen or twenty years in a large number of states.

"As a result of a questionnaire sent to a group of 108 large cities only a few months ago, we discovered that since 1931 the average per capita expenditures for public health has dropped from an average of one dollar to 81 cents. The most disturbing feature of this picture was the fact that the greatest reductions occurred in many of those cities which in 1931 were recognized as falling far short of the minimum standard of expenditures generally considered necessary for health service. Thus, Peoria, which in 1931 spent the ridiculous amount of 28 cents per capita for such work, further reduced its health expenditures in 1933 to 17 cents. Other cities which came within this category were Akron, Ohio, with a reduction from 51 cents to 37 cents; Winston-Salem, N. C., from 70 to 44 cents; Birmingham, Ala., from 37 cents to 22 cents. The cities which had developed good organizations have apparently learned the value of their investment in health facilities and have made only moderate reductions in budgets.

"Ordinarily, we do not apprcciate the benefits that we have enjoyed from the protections set up by the health officer and his associates. We take these for granted. But once the axe begins to work and large sums of money are divcrted from health channels, very real services are missed and these may determine in many instances whether people will be sick or well, whether people will live or die. We are not concerned with academic but rather with very real and practical issues. The money spent heretofore for health service has more than paid for itself and in a hundred ways. Communities should beware even under the most trying financial conditions of still further reducing their health budgets. This is the time of all times when the public health must be preserved."

OF GENERAL INTEREST

Dr. J. J. Rouse, formerly of Nopeming Sanatorium, Nopeming, Minnesota, has moved to Neshkoro, Wisconsin.

Dr. Viktor O. Wilson has opened an office at 1251 Medieal Arts Building, Minneapolis, for practiee in diseases of infants and children.

Dr. James J. Swendson, formerly with the Earl Clinic, has opened offices at 714 Lowry Medical Arts Building, Saint Paul, where he will continue the praetice of obstetrics.

Dr. Max H. Hoffman of Saint Paul, who spent the past nine months in Europe, has returned to his practice. Dr. Hoffman spent most of the time studying in Vienna. He then toured several countries and sailed for home from London.

Dr. Arthur C. Straehauer, Minneapolis, delivered the address in surgery at the eightieth anniversary meeting of the Dubuque Medical Soeiety, Dubuque, Iowa, on the subject of "Cancer of the Rectum and Large Bowel," September 12, 1933.

Dr. V. L. Evans, graduate of Loyola Medical Sehool, who took his internship at Mercy Hospital, Chicago, recently finished a three-year fellowship in Internal Medicine at the Mayo Clinic and has become affiliated with the Bratrud Clinic at Thief River Falls, Minnesota.

Dr. William C. Bernstein of New Richland, Minnesota, has returned from Europe where he was a member of the 1933 tour of the Interstate Postgraduate Medieal Assembly of North Ameriea. In addition to attending the principal clinics in the large medical centers of Europe, the Assembly, this year, visited clinics in Russia, mainly in Leningrad and Moseow. Dr. Bernstein reports that medicine is practiced differently in the Soviet Republic than in any other country, and that although the clinics there were unique they were most interesting.

WARNING TO PHYSICIANS

A letter has been reeeived by the State Secretary warning physicians to be on the alert for a morphine addict who elaims conneetions in some way with the U. S. Veterans Hospital or the Minnesota Soldiers Home and is out of morphine. In verification of his identity he telephones a fictitious Major Morgan, or some other person, who verifies the addict's statement and asks the doetor to supply the morphine and send him the bill.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

ITINERANT QUACK ARRESTED AT ELK RIVER, MINNESOTA

State of Minnesota vs. Gerhard John Stramer

On August 18, 1933, Gerhard J. Stramer, thirty-three years of age, entered a plea of guilty to a charge of practieing healing without a Basie Scienee Certificate, before the Honorable Arthur E. Giddings, Judge of the District Court at Anoka, Minnesota.

Stramer for some time has been calling on farmers and other people with a medicinal preparation that he has been selling called Trunox. He has made a specialty of calling on those suffering from arthritis, neuritis and other such ailments. In July of this year Stramer was arrested and entered a plea of guilty to peddling without a license at New Ulm, Minnesota, at which time he was fined $50.00 and costs. He was ordered to leave the State of Minnesota due to the fact that he is not a resident nor a citizen of this state, having come here from Pasco, Washington, about May 15, 1933. It developed, however, that Stramer did not leave the state but returned to the vicinity of Elk River. Upon being questioned, it was learned that Stramer was born at Norway, Iowa, and that his mother and stepfather live at Watkins, Iowa. When he was brought before the Court it became known that his family was practically destitute and that the proceeds from the sale of medieine had been spent chiefly for traveling around the country.

Upon Stramer's agreeing to refrain absolutely from violating the laws of this state in the future, and upon his agreeing to return to the home of his mother at Watkins, Iowa, together with his family, the Court imposed a jail sentence of six months, which was suspended. Stramer was given to understand that he must discontinue this business in its entirety and that he was to find some other occupation. He was also warned that if he attempted to follow the same oeeupation in the State of Iowa, he undoubtedly would be prosecuted down there.

Stramer drives a 1928 Chrysler eoach automobile bearing Washington State license for 1933: 292-843. He is a garage mechanie by trade.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medieal Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medieine, Medical Sehool, University of Minnesota.

The program for the month of October will be as follows:

October 4—Heart Murmurs.
October 11—Dermatitis and Cosmetics.
October 18—Food Magie.
October 25—Forerunners of Cancer.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

Dr. A. C. Baker of Fergus Falls is the new president of the Northern Minnesota Medieal Assoeiation, elected at the annual meeting held in Willmar, September 8, 9 and 10. The 1934 convention will be at Thief River Falls. Dr. J. F. Dubois, Jr., of Sauk Center, is viee president, and Dr. Oscar O. Larson, Detroit Lakes, secretary-treasurer.

RENVILLE COUNTY SOCIETY

The Renville County group is in the midst of its tenth annual extension course of lectures. The secretary writes that the members have acquired the habit and feel they cannot practiee medicine without the extension eourse. The schedule is as follows:

Sept. 19—Dr. Moses Barron—"Anemias, Classification and Treatment"
Sept. 26—Dr. Harry P. Ritchie—"Some Problems in Reeonstruction Surgery"
Oct. 3—Dr. J. C. Litzenberg—"Abortions"
Oct. 10—Dr. H. E. Michelson—"Skin"
Oct. 17—Dr. Myron O. Henry—"Intracapsular Fractures of the Hip"
Oct 31—Dr. J. A. Myers—"Tubereulosis"
Nov. 7—Dr. F. C. Rodda—"Differential Diagnosis. Meningitis and Simulating Conditions"

Nov. 14—Dr. A. F. Bratrud—"Treatment of Hernia by Injection Method"
Nov. 21—Dr. G. R. Dunn—"Fractures"
Nov. 28—Dr. E. J. Huenekens—"The Differential Diagnosis and Treatment of Convulsions in Childhood"

STEARNS-BENTON AND UPPER MISSISSIPPI JOINT MEETING

Members of the Stearns-Benton and Upper Mississippi Medical Societies, with all medical men from surrounding districts as invited guests, will hold their annual joint meeting at the St. Cloud Hospital, Thursday, October 12.

The meeting will begin with a tour of the hospital at 5 p. m. Dinner is scheduled at the hospital at 6:30 p. m. to be followed by a scientific meeting in the evening.

Among the speakers are N. O. Pearce, Minneapolis, president of the State Association; E. A. Meyerding, Saint Paul, secretary; W. F. Braasch and M. S. Henderson, Rochester; C. B. Wright, Minneapolis, and F. J. Savage, Saint Paul.

The council of the State Association will meet at the hospital at 2:30 p. m. preceding the meeting. Council members and state officers will be present at the joint meeting also to participate in discussion.

Members are urged to bring non-member physicians to the meeting. Dinner will be 50 cents.

MEDICAL ALUMNI ASSOCIATION

The sixth annual clinical meeting of the Minnesota Medical Alumni Association will be held Friday, October 27, 1933, at the University Hospital in Minneapolis. This meeting will be the day before Minnesota's Homecoming game with Iowa. There will be a luncheon at the University Hospital for those attending the meeting. All persons interested in attending the meeting will be welcome.

The following program will be presented:

MORNING SESSION—9:00 A. M.

E. L. GARDNER, M.D., *Chairman*

Skin Clinic
John Madden, M.D., Saint Paul
Injection Treatment of Hernias
A. F. BRATRUD, M.D., Minneapolis
The Rôle of Calcium in Medical Treatment
Reuben Johnson, M.D., Minneapolis
Childhood Tuberculosis
C. A. Stewart, M.D., Minneapolis
Subject to be announced
Laurence R. Gowan, M.D., Duluth
Obstetric Comments
Fred Adair, M.D., Chicago, Ill.
Luncheon and Business Meeting, University Hospital
Richard E. Scammon, M.D., Minneapolis
Edward D. Anderson, M.D., Minneapolis

AFTERNOON SESSION—2:00 P.M.

O. S. WYATT, M.D., *Chairman*

The Rôle of Arsenic in Causing Polyneuritis
W. D. Shelden, M.D., Rochester
Pyuria
W. Downing, M.D., Le Mars, Iowa
Symptoms of Refractive Error
Merritt W. Wheeler, M.D., Saint Paul
Surgery—Subject to be announced
W. O. Ramstad, M.D., Bismarck, N. D.
Shoulder Joint Injuries
Joseph R. Kuth, M.D., Duluth
The X-ray in Treatment
Russell Gates, M.D., Minot, N. D.

WOMAN'S AUXILIARY

President—MRS. A. A. PASSER, Olivia
Chairman Press and Publicity—MRS. GLEN R. MATCHAN, Minneapolis
Editor—MRS. S. H. BAXTER, Minneapolis

This year the principal objectives of the Women's Auxiliary include: Membership; Health Education, and Public Relations. The state president, Mrs. A. A. Passer, has visited county auxiliaries at Granite Falls, Shakopee and Minneapolis, and represented the State Auxiliary on the program of the annual meeting of the Minnesota Federation of Women's Clubs held at Duluth, September 27, 28, and 29. The next regular board meeting will be held at The Commodore in Saint Paul, Friday, October 20. All Auxiliary members are invited to attend this session.

CAMP RELEASE AUXILIARY

The regular meeting was held at Granite Falls, August 27, preceded by a picnic supper with the Camp Release Medical Society. Mrs. J. Dordal, president of the Auxiliary, presided. A Reciprocity Tea was sponsored by the Auxiliary at Sacred Heart on September 20, to which all officers of the women's lay groups of the district were invited. Mr. Manley Brist of Saint Paul was the speaker for this occasion.

SCOTT-CARVER AUXILIARY

A joint gathering of the doctors and their wives, of Scott and Carver Counties, was held at Chaska Tuesday evening, June 13. After a 7:30 banquet at the Chaska Cafe the ladies adjourned to the B. H. Simons home, and the doctors gathered at the American Legion hall. Both were annual meetings.

Officers of the women's organization named are: Mrs. H. E. Wunder, president; Mrs. H. P. Fischer, vice president; and Mrs. P. M. Fischer, treasurer, all of Shakopee.

A dinner meeting of the Auxiliary was held at the home of Mrs. H. E. Wunder, at Mudcura Sanitarium, Shakopee, Tuesday, August 9. The county president, Mrs. H. E. Wunder, conducted the business session at which Mrs. James Blake, national president, and Mrs. A. A. Passer, state president, were guest speakers.

HENNEPIN COUNTY AUXILIARY

The first meeting of the year will be held at the home of Mrs. Carl Waldron, 4875 East Lake Harriet Boulevard, Minneapolis, Friday, October 6, with Mrs. Fred Erb, county president, in the chair. The program includes talks by the national, state and county presidents, and a group of songs by Mrs. Agnes Teasdale. Guests of honor are Mrs. James Blake, Mrs. Adolph Passer and Mrs. Martin Nordland.

ST. LOUIS COUNTY

The regular meeting of the Auxiliary was held at the home of Mrs. M. A. Nicholson of Duluth, September 12, after a one o'clock luncheon. The feature of the session was a membership drive. Music was furnished by Mesdames Morton McQuade, K. R. Fawcett, F. H. Magney and B. F. Eckman. The new officers of the year were installed and Mrs. A. G. Bianco, county president for next year, conducted the meeting.

The Auxiliary mourns the death of a former county president, Mrs. Frank Knapp of Duluth, who died recently after a long illness.

Minnesota State Medical Association

Eighteenth Annual Meeting

Rochester, Minnesota

PROCEEDINGS OF THE HOUSE OF DELEGATES

(Continued from September, 1933, issue)

The next order of business is the report of the Committee on Schools for Laboratory Technicians.

REPORT OF THE COMMITTEE ON SCHOOLS FOR LABORATORY TECHNICIANS

The committee on Schools for Laboratory Technicians has had no meeting this year. In view of the persistent refusal of the House of Delegates to take any action along the line, which the committee has recommended in the past, I felt it was unnecessary for us to prepare any recommendation. The committee has functioned merely in the matter of recommending to individuals who write in as to where they can get good courses in laboratory and x-ray technic.

Sincerely yours,

LEO. G. RIGLER, *Chairman.*

PRESIDENT PEARCE: Dr. Leo Rigler is chairman of that committee. Is Dr. Rigler here? (Absent) Is there any other member of the committee who wishes to discuss the report?

DR. CHARLES R. DRAKE (Minneapolis): Just a word in connection with that. This report is not exactly correct because the Council a year ago did approve the methods of the American Society of Clinical Pathologists for the supervision of schools for technicians and for the registry of technicians.

During the past year we have had a temporary injunction held against a certain agency in Minneapolis, enjoining them from saying anything about a certain school. In that injunction my remarks at the previous meeting were incorporated, so Dr. Johnson's ideas of having some things deleted from this report would be good.

I feel it would be desirable for members of the House of Delegates or their friends, those associated with them, whenever they need technicians, to attempt at least to secure them from these recognized schools or from the registry of technicians that is supervised by the American Society of Clinical Pathologists at their headquarters in Denver, Colorado. There are four approved schools in Minneapolis and Saint Paul, two in each place. The University should be on the list but it lacked one dollar. I think it will be on the list. Anyway, from those five places you can secure technicians, who, I think, are properly trained and under proper supervision.

QUESTION: What are the schools?

DR. DRAKE: The General Hospital and Swedish Hospital in Minneapolis, the Miller Hospital and the Ancker Hospital in Saint Paul, and, as I say, when the dollar is forthcoming, the University will be on the list.

PRESIDENT PEARCE: Dr. Magney of the Reference Committee.

DR. F. H. MAGNEY: The Reference Committee recommends the adoption of this report.

PRESIDENT PEARCE: Is there any discussion of this committee report? If there is no discussion, I declare it is the sense of the House of Delegates that the report be accepted.

The next is the report of the Committee on Public Health Nursing. Dr. Burnap.

REPORT OF THE COMMITTEE ON PUBLIC HEALTH NURSING

This committee can report little accomplished since January 1, due to the shortness of the time since assuming its duties and the fact that much more pressing problems are so absorbing the attention of both the doctors and nurses that the conditions which called for this committee have either been submerged or eliminated.

We wish to pay tribute to the earnest and constructive work done by Dr. Oerting and his committee last year, and the coöperation of Miss Olivia Peterson. We can not do better than carry out some of their plans.

The problems with which this committee deals are largely rural as the large cities have their own rules regulating public health nurses. Our chief function is to assist in promoting a harmonious and beneficial cooperation between the doctors in the small cities and rural communities, and the public health nurses working there. To this end "Suggestive Policies and Standing Orders for Public Health Nurses" were compiled and are furnished not only to nurses but doctors and others who desire them. These set forth quite clearly what a public health nurse should and should not do. It is the plan of the committee later on with the assistance of Miss Peterson to make such revisions as experience has shown desirable.

Too often when in the field, the nurse, though having the best of intentions, oversteps her functions because she has no responsible local head. It was therefore deemed best to have a local Committee on Public Health Nursing appointed by the president of all component societies. This was done in most instances last year, but very few have functioned. We have written all the chairmen asking for suggestions and objections and will attempt to develop a state-wide functioning organization.

This committee through our legislative committee assisted in defeating House File No. 723, which was designed to allow a large number of unqualified nurses to register.

Though many feel there are important defects in our present nursing regulations and desire some change, it was manifestly unjust to cheapen the meaning of R.N. Hundreds of fine capable girls have sacrificed much to acquire it and are entitled to the distinction it confers. Furthermore, if this could be done to them it could be done to doctors, dentists and other professions.

There has been an agitation for midwife nurses to be stationed at various points in the northern part of the state. The argument is that doctors are not available in many sections. We have corresponded with a number of doctors, who have practiced in this region for a number of years, leaders in the profession and well informed as to conditions locally and in the surrounding territory. All report that in their opinion confinements are well cared for under present arrangements. It would seem that the needs of these sparsely settled financially distressed regions, could much better be provided by subsidizing doctors, when necessary, until the community becomes self-supporting.

Your committee is pleased to serve the society and hopes during the coming year to be of service to those most concerned, the doctors, nurses and communities.

Respectfully submitted,

W. L. BURNAP, M.D., *Chairman.*

DR. W. L. BURNAP: I don't think we should take any more time on this committee report now. But there are

some problems, I think largely due to our own neglect. We are new on the committee, and we would appreciate your knowing there is such a committee, and if you have some problems refer them to us, because we know there is a tendency among a certain element where nurses do assume a good many of the responsibilities of the physician, most of them thoughtlessly. Maybe in another year we will have more to report.

There is one thing I would like to mention off the subject, which probably did not make as much impression on some of the men who haven't been in touch with this legislative matter as on some of the others. That is the matter adopted by the Council making it unprofessional to introduce legislation which has not been approved by the Council. That is a very important thing.

Two or three things have come up this year where men have gone in and introduced legislation. They tried to cause trouble for the Legislative Committee because they personally introduced legislation without consulting the Legislative Committee, or without consulting the Council. Now they are resenting the fact that the Legislative Committee did not support this legislation. I think it is worth while for all you men to let the men throughout the state realize that. We realize it, but we do a lot of things thoughtlessly. I think that is one of the best things that has been done.

DR. F. H. MAGNEY: We recommend the approval of the report and suggest that the State Medical Association go on record as opposed to public health nurses entering into the field of medicine, especially in the capacity of a midwife.

PRESIDENT PEARCE: Is there any discussion on the report of this committee? This nursing problem is one that we are going to have to take up in a more serious manner before very long, for more than one reason. Perhaps the principal reason is that the nursing situation today is pathetic. They need our sympathetic interest in the matter. We feel certain there are far too many doctors being turned out. We might say that for every surplus doctor being turned out, there are at least ten surplus nurses being turned out. There are so many nurses, there is no possibility whatever of these nurses who are graduating from our accredited nursing schools finding employment in bedside nursing. There is certainly no chance of their finding jobs in nursing institutions.

There are already between 400 and 500 engaged in public health work of one kind or another, industrial nursing, or whatever you might call it. That is a field that the social organizations and municipal organizations of various types are turning to for cheap medical inspection, cheap medical service. I think it is time that we get at the root of that thing. Of course, the way out is not to train so many of these people. These nurses that are being turned out of our first class hospitals are pretty well trained. They have spent a lot of time, and some of them have spent considerable money in obtaining that training. I think it is very wrong that they should be given all this training and spend all this time only to find, when they get through, that there is nothing for them to do.

I looked into the matter a little while ago and I found that in Hennepin County we have 1,000 first class trained nurses registered in one registry, that is the Third District registry. During 1932 there was an average of 400 of those nurses out of a job. In other words, they were waiting for someone to call them to work. They were being called at the rate of twenty-five a day. So far in 1933, and this is the best time of the year for them, there have been about 500 of those nurses simply sitting home, waiting to be called. It is a deplorable situation. I don't believe that the leaders in the nursing profession have taken hold of the matter and used the proper leadership.

The training schools have a very serious problem to solve, if they do anything different than having these unpaid employees to help with the work in the hospitals. Still they are turning out a lot of people who are pretty well trained in the practice of medicine, and they are going to turn to some other plan of making a living besides bedside nursing, if they are forced to do so.

As Dr. Johnson said, there is nothing that defines the scope of activity of the trained nurse. Consequently, I suppose she would be like a lay person. She would have no more right to practice medicine than a lay person would.

I think Dr. Burnap's committee ought to take this thing up seriously, not only the question of public health nursing but they should broaden out the whole question of nursing. There are something like 12,000 nurses that have been registered and licensed in Minnesota. As I understand it, there are something like 2,700 or 2,800 now in training in the state, and they have graduated about 800 or 900 more in the last few weeks. As a medical profession, we ought to take some responsibility in the matter.

I would like to see Dr. Burnap's committee really take hold of that problem and see what they can do about it.

Is there any other discussion on this report? If there is no other discussion, and if there is no objection, we will consider that it is the sense of the House of Delegates that the report be accepted.

The next order of business is the report of the Committee on University Relations. That is composed of Dr. Workman as chairman of the Council, the president and the four last presidents. We have contacted Dr. Scammon and his committee. He is still in trouble about his budget, and he has not yet gotten to the point where he knows what he is going to have to spend. He asked this committee to meet with him, but they thought it was better not to meet until he knew exactly what he was going to have to do with. At that time he wished to tell us about their program over there and have our advice. We have no report to make further than that at this time.

The next is the report of the Committee on Military Affairs by Dr. Smith.

REPORT OF COMMITTEE ON MILITARY AFFAIRS

As chairman of the Committee on Military Affairs of the State Medical Association, I have the following report to make: The inactive training period for medical reserve officers was held from October 15 to 29 at Rochester with an attendance of 123 men. A full report was given in the *National Reserve Officer*. Schools have been held in the Twin Cities and throughout various sections of the state under the supervision of local reserve officers, there being no regular army officer detailed for the purpose at the Headquarters of the 88th Division. Major Gutherie, M.C., U.S.A., of the University has conducted a correspondence course and I understand that Colonel Knoght at Fort Snelling has been doing similar work.

F. L. SMITH, *Lt. Col. Med-Reserve.*

DR. F. L. SMITH: Mr. President, there isn't much more of a report to make. The inactive training period for medical reserve officers was held from October 15 to 29 at Rochester with an attendance of 123 men. We had eighty-eight men from twenty-four different states, from Connecticut to California and from Canada to Florida. We had a regular two weeks' training school, at which time the men received 100 hours' credit. It was a very successful school.

This was the fourth year we have held the course here, and we are planning on a similar course this next year in which the Naval Reserves are included. If any men wish to gain credits to get in active service, they can make their applications to the corps surgeon at Omaha, Nebraska. I was at the meeting of the State Reserve Officers' Association yesterday, and I couldn't help but notice the change in personnel in the past few years. The younger men of the line are coming in very

rapidly. But I didn't see a similar ratio of the younger physicians, which is a deplorable condition.

Our medical society should at least exert pressure on all the men who are coming out of the universities and locating in the state.

Somebody mentioned the civilian conservation camps. I might state that at Snelling there will probably be in the neighborhood of 4,500 men trained this summer, in camps of about 200 to 250 at a time. Each one of these groups is going to have one medical officer.

Regarding a local physician taking care of them, of course, that might be possible, but the camps are going out fifty and seventy miles away from town, and it is necessary that they have their physician with them.

I would suggest that this would be the proper procedure: Wherever a camp is located, any man who is interested should apply to the corps surgeon for the privilege of practicing as a contract surgeon, or apply for a commission. That would be the two ways of getting a physician to take care of these men. But the great majority of them are going way off into the woods where you could not get to them.

Dr. F. H. Magney: The Reference Committee recommends the adoption of this report.

President Pearce: You have heard the remarks of the chairman of this committee. You have had the report. You have heard the recommendation of the Reference Committee. Is there any discussion? If there is no discussion, and if there is no objection, we will consider that it is the sense of the House of Delegates that this report be accepted.

The next order of business is the report of the Committee on Medical Economics. This is a Council committee, authorized by the House of Delegates some two or three years ago. This year the Economics Committee have occupied themselves with four problems. In order to study these problems, there have been four subcommittees of the Economics Committee appointed.

The first problem that was taken up was the study of the care of the indigent in Minnesota.

A REPORT OF THE SUB-COMMITTEE TO STUDY CARE OF THE INDIGENT

A committee appointed by Dr. N. O. Pearce, president of the Minnesota State Medical Association as follows, F. E. Harrington, M.D., Minneapolis, Chairman; S. H. Baxter, M.D., Minneapolis; B. F. Davis, M.D., Duluth; F. A. Erb, M.D., Minneapolis; J. C. Michael, M.D., Minneapolis; F. J. Savage, M.D., Saint Paul; T. H. Sweetser, M.D., Minneapolis; J. A. Watson, M.D., Minneapolis, begs leave to make the following report:

A meeting was held at 2:00 P.M. on Sunday, April 2, 1933. All members were present.

The preliminary report of this committee was discussed. The purpose of this report is to present to the State Medical Association principles on which plans can be formulated to guide the State Association and its component county societies for the care of the indigent in Minnesota.

The committee has the following general recomendations to submit:

1. The medical, surgical, and public health care of any community is the responsibility of the medical profession and should be under their jurisdiction.

2. The mode of administration of free medical and surgical care of the indigent in any community is the problem of the local county medical society, although the constitutional government is responsible for the expense thereof.

3. Since it is recognized that food, shelter, clothing and medical attention must be furnished the indigent, in whole or in part, by the community, this committee feels that the practitioners of medicine should be reasonably compensated for their services.

4. Agreements should be made between local units of government and the local medical societies to furnish medical and surgical care to the indigent in their districts, such agreements to be varied to suit local conditions.

The committee definitely disapproves of any method of competitive bids or contracts by individuals or groups in the matter of compensation for the care of the indigent.

5. This committee feels that the best interest of the patient and the proper practice of medicine can be had by arranging for the services of the practicing physician rather than the attendance at free clinics.

6. Various plans for the solution of these problems are already in operation in this section of the country. The Duluth Plan is especially cited.

7. Plans proposed, plans in operation, or plans in the process of adoption in this section of the country are in the hands of the Committee on State Health Relations and need not be duplicated here.

8. With regard to patients of sub-standard financial status seen as private patients, this committee feels that a plan for the classification of patient's ability to pay should be worked out as a general guide for medical and surgical charges. This classification should be in the hands of every member of the State Medical Association as a general guide for the determination of minimum charges to be made.

Respectfully submited,
F. E. Harrington, *Chairman.*

President Pearce: Dr. F. E. Harrington of Minneapolis is chairman of that committee. Is Dr. Harrington present? The report of the committee has been submitted to the House of Delegates. It has been approved by the Council. We now ask for the report of the Reference Committee.

Dr. F. H. Magney: We recommend the approval of the committee's report with the change that Paragraph 5 should read "That in the future, as far as possible, contracts be made with this in mind."

We further recommend that instead of a new committee being formed, the duties of this committee be included in the Committee on Medical Economics.

The reason the wording is changed is that in certain cases where men do work for the state, in the state hospitals, it would be embarrassing to have the original wording.

President Pearce: You have heard the recommendation of the Reference Committee. I wanted to bring out clearly (I am sorry Dr. Harrington isn't here) that there were three things I considered of importance to the medical profession of the state. In your action endorsing the action of this committee, there seems to be a little confusion about it. Your Economics Committee is a Council committee which will continue from year to year. It was appointed by the Council.

These committees that are reporting under the various heads are subcommittees of that Council committee, so they will be continued by the Council, as they see fit, and will be a part of the Economics Committee.

The thing that seemed to me of extreme importance in this committee report is this: They spent quite a little time in discussion. They had two or three meetings. One of the things that they laid down is a principle which, if we adopt, perhaps would be a little different from our attitude before, and that is that physicians should be paid for services to people who were unable to pay, and that the responsible party, whoever was caring for these people, for food, clothing and so forth, should also be responsible for the care of their health.

We are laying down a principle here that in all organized charity work (our own private charity work is different) physicians should be paid for their services. That is one of the things we have laid down in this committee.

Another thing which seemed to me of great impor-

tance, that affects our cities much more than it affects the more rural districts is this: A great tendency in taking care of the poor is to build up great, centralized clinics where people come, and the doctors work, in many cases, without remuneration.

There is little attempt made to ascertain whether people are able to pay anything, part or all, for their service. The service is not of a high order because of the fact there is so much volume that has to be handled.

This committee went on record recommending that the present trend for the care of the indigent, having them go to large, centralized clinics, be reversed. It will take some time to do it, but they feel that the best place for a person who is unable to pay anything or only a part of the physician's fee, to go is to his neighborhood family physician and to be taken care of at whatever rate is deemed reasonable for that care. In other words, let us get away from the tendency to build large clinics, with social service workers, and all that sort of thing, and get these people back into the hands of their own doctors, because once they get into the hands of these centralized clinics, it is hard to get them away. We feel that the physician is in better position to judge whether the people are able to pay, and we feel they will get better service than they will at the clinics.

There is one other recommendation, the result of Dr. Savage's suggestion, which is the one recommendation that the committee wishes to study further, and that is to study possible methods of working out some plan by which people who are not entirely indigent could be graded in some way, so they could go to physicians and receive medical service on some basis which they were able to pay.

Is there any further discussion of this report? If there is no discussion, we will consider that it is the sense of the House of Delegates that this report be adopted.

The second committee which was appointed was one to study the question of contract practice. You are all fully aware that we have had committees on contract practice for a good many years back. The fact of the matter is, in looking over the history of this organization, one of the first resolutions put on the books of this society, about 1869 or 1870, was a resolution denouncing bidding and proposing for work, as being undignified and being a tendency to lower the standing of the physician in his community and lowering his fee. That resolution, as far as I know, is still on the books of this society, but we are sixty-five or seventy years later studying the same question.

Dr. White and his committee have drawn up a report.

REPORT OF SUB-COMMITTEE TO STUDY CONTRACT PRACTICE

The following were the proposals recommended to the State Medical Association by the sub-committee of the Economics Committee of the State Medical Association which held its meeting at the Minneapolis Club, April 23, 1933:

1. We recommend that the State Medical Association oppose any contract or agreement, written or verbal, for practice at rates of compensation which when applied in general to the economic group in question would be calculated to lower the character of medical service, impose burdens of time or effort which would prevent constructive and progressive planning or attract into it men with inferior training or ability. To perform adequate service to the patient or to other interests the physicians must be able to keep abreast of medical progress by postgraduate work, study and attendance at medical meetings.

2. We recommend that the State Medical Association oppose any contract or agreement, written or verbal, for practice in which the determination of the form or character of service rendered does not rest wholly with physicians and with the individuals or groups to whom medical service is rendered. This is meant to oppose practice or control by any non-medical corporation, group or interest such as corporations for a profit, insurance companies, hospitals; etc., and does not include properly constituted associations or individuals seeking medical service.

3. We recommend that the State Medical Association oppose all forms of competitive bidding by physicians or groups of physicians for contract for practice of any kind.

4. We recommend that the State Medical Association oppose solicitation for practice in any form as outlined in the code of ethics of the American Medical Association.

5. We recommend that the State Medical Association oppose contracts or agreements, written or verbal, except on a basis of compensation for a specific service rendered as opposed to a salary arrangement and that in the future contracts be made with this in mind.

6. We recommend that the State Medical Association provide a standing committee on Economic Progress, this committee to consist of nine members, three members to be appointed annually by the president. For the first year three members to be appointed for one year, three members to be appointed for two years and three members to be appointed for three years. We further recommend that all proposals for contracts or agreements be submitted to this committee for approval in coöperation with the unit society involved. This committee will keep records of contracts in operation or proposed in confidential files and could act in an advisory capacity to industries or other interests as to proper and effective forms of such contracts and agreements.

S. Marx White, *Chairman*
H. C. Arey,
A. C. Baker,
J. M. Culligan,
M. S. Henderson,
F. M. Manson,
R. F. McGandy,
H. R. Tregilgas.

President Pearce: Dr. White is here, and I would like to call on him at this time.

Dr. S. Marx White: The committee is aware of the extreme importance of the problem of handling the subject of contract practice in some proper and studious manner.

The recent report of the Committee on the Costs of Medical Care bring into the foreground the necessity of the medical profession meeting in some more adequate way, apparently, than we have met it, the needs of the economic groups that are unable to pay what seem to be ordinary fees and hospital charges.

The committee has had two or three things, particularly, in mind in framing these recommendations as they have been put into your hands. I would like to call attention to the character of the fifth recommendation which we laid before you, not as a final proposal but we believe it states what at the present time is a fair approach to the problem of furnishing care for groups of individuals. We put it this way:

"We recommend that the State Medical Association oppose contracts or agreements, written or verbal, except on a basis of compensation for a specific service rendered as opposed to a salary arrangement and that in the future contracts be made with this in mind."

That may not be your desire, but we felt it would be well to take some such step as this. But, more important than that, the committee felt there should be an adequate basis laid in this Association for study and for progressive approach to the problem. It may have been outside of its province, but it stepped into this with this new idea:

"We recommend that the State Medical Association provide a standing committee." We would like to see

some such name as Economic Progress rather than Economics. For instance, our Committee on Economics is an excellent committee but so many of us think that such a committee is sort of a stop-gap and something to put the "kibosh" on things rather than to plan and provide for progress.

This recommendation is not made with the idea of a new committee, but it is made with the idea of emphasizing the association's progressive spirit of approach to economic questions. We simply recommend, if it is your will, or suggest, that the name of the committee be changed to that of Economic Progress.

The committee has felt that in view of the recent publication of the report of the Committee on the Costs of Medical Care, a great deal of publicity has been given to that side of the question. In framing these recommendations, we had in mind that every recommendation here was one with which the public should be acquainted. If the Association adopts these recommendations, I would suggest that the secretary be empowered to have them published. A suggestion I would like to see carried out is that, if they are given to the newspapers, they be required to publish them *in toto,* instead of pulling out what they think will cause a little excitement and put us in an unfair position, and that they be published as a whole as the present status of the subject, so far as this Association is concerned.

Dr. F. H. Magney: The Reference Committee read over the sub-committee's report. It is Paragraph 5 that we spoke of. It says: "We recommend that the State Medical Association oppose contracts or agreements, written or verbal, except on a basis of compensation for a specific service rendered as opposed to a salary arrangement, and that in the future contracts be made with this in mind."

The last part we changed to "That in the future, as far as possible, contracts be made with this in mind." That is to avoid embarrassment on the part of certain workers for the state.

With reference to the final paragraph, the Reference Committee has been wading through stacks of committee reports, and it did not look very good to us to see new committees formed. So we recommend that this work be put under the Committee on Medical Economics. Otherwise the report is accepted.

Dr. A. B. Stewart (Owatonna): May I ask a question? I think you touched on it but how would this affect a man working on a salary for the different state institutions?

Dr. F. H. Magney: That is the reason it was changed by the Reference Committee. We recommend that that be done as far as possible, leaving a loophole for the state institutions.

President Pearce: Is there any further discussion of this report?

Dr. C. B. Wright (Minneapolis): I think that is a very good report, and I think it embodies the interpretation of our principles of medical ethics, which we need at the present time more than anything else, as applied to this new field of industrial and contract practice. If we could get medicine back on a fee basis, I think we would do a lot for the profession.

I would like to say one word about the doctors getting paid for taking care of the indigent. We all like to get paid for all the people we take care of for nothing, but I have always asked myself this question: Who is going to pay us? How much are they going to pay? How are they going to do it when they haven't the money?

Some of us get a little pleasure out of taking care of certain people for nothing. One of the greatest pleasures that a man has in the profession of medicine is giving something for which he expects no return. I believe we should, where we can do it, without changing any of our fundamental principles in regard to the practice of medicine—I think it might be all right in specific instances, but at the same time I question very much, and I think we ought to think seriously about going on record as advocating that we give up to the state all of our patients who happen to be temporarily unemployed or are unable to pay and tell them, "You are a state problem." I think that should be thought out pretty carefully.

I just bring that up because I know this thing is being discussed all over the country. I know that we are all hard up. I know the present economic situation is serious, but I think the principal thing, the thing I would like to see (and I don't know whether it can be brought about or not) is this recommendation of the committee which I think is very important. If we can make a decent living and go on practicing just the way we are doing, I personally would not like to see our methods of practice changed.

President Pearce: I would like to say that Dr. Harrington's report does not contemplate any plan interfering in any way with any man's private charities in his own practice. It simply lays down a principle that where you have an organized charity and they are paying nurses, social workers, business manager, and everyone else, the doctor also should be compensated for the care of the people.

Dr. S. Marx White: Could I ask the privilege of the floor again, not being a delegate? I would like to ask for information as to the method by which the present Economics Committee is appointed or constituted. Is that a new committee each year, or is it a committee which continues by some method of renewal over a period of time? Dr. Pearce was not present at the period when this last recommendation was made by our committee, and we could not get the information. Could I be informed on that point?

President Pearce: The House authorized the Council three years ago to appoint the committee and also authorized the expenditure of necessary funds for clerical work to take care of anything along that line.

The committee has been appointed from year to year by the Council. There are three primary members of the Economics Committee. This year we appointed four sub-committees to take up special problems, selecting people that we thought would be especially interested and able to discuss those problems.

This committee is taking a very definite stand on something, and that is that all contracts, verbal or written, governing medical practice shall be referred to this committee. In that way, while it will be more or less confidential, the committee at least will have the opportunity to disapprove of the contract if they feel it is unfair to the profession, that it isn't a good contract. I think under those circumstances such a committee as that would continue to function, because they would have a definite job to do.

However, there would be some committees to study certain problems, and as soon as they solved those problems they would pass out of existence. We are trying to avoid, if possible, building up new committees to be repeated from year to year, even after the function they were appointed for ceased to be of any importance.

The committee that you are reporting for is a subcommittee of the Council's Committee on Economics.

Dr. S. Marx White: This body would not pass on the question of the constitution of that committee anyway. The Council would do that. I simply wanted to get that recommendation across to the Council. I don't want to insist on this point if the Council does not see fit, but we felt there should be some method by which a continuing, properly constituted committee, with new members each year, would get together with some members holding over, to have this as a progressive matter. This isn't the sort of thing a new committee can tackle each year. You will get nowhere if it is done that way.

I would suggest, as chairman of the committee, that the spirit of this sixth recommendation be considered by the Council. They, in their wisdom, could decide whether that is a better mechanism than there is

at the present time for carrying on the work of the Economics Committee, and the further suggestion, for publicity purposes as much as anything else, that the idea of continuing and progressive activity on the part of this committee be exercised.

Dr. C. L. Scofield (Benson): I move that this report be referred to the Council.

President Pearce: You have heard the recommendation. If there is no objection, it is the sense of the House of Delegates that this matter be referred back to the Council.

The next committee to report is the Committee on Insurance Compensation Practice. Dr. Hayes is chairman of that committee.

Dr. J. M. Hayes: Dr. Johnson has already mentioned this committee as the one that has met with these insurance companies and "cussed" and discussed at considerable length. As he said, at times we weren't sure whether we were going to come to agreement or not, but we finally agreed that it was through misunderstandings that we had most of our trouble, and we are going to try to get together. This paper will tell what we are trying to do.

Dr. Hayes then read his report.

REPORT OF SUBCOMMITTEE TO STUDY INSURANCE AND COMPENSATION PRACTICE

The committee was appointed by the president to investigate and report on the problem of the medical care of disabilities coming under Workmen's Compensation and other forms of disability compensable by insurance and its relation to the medical profession, insurance companies and the Industrial Commission.

After a number of conferences with groups of doctors and representatives of liability insurance companies and also the Industrial Commission we respectfully submit the following report and resolution:

Our investigation shows that this type of medical practice is on the increase; that it is bringing up serious problems which are detrimental to good feeling among the physicians; it is creating antagonism to insurance companies; it is adding unnecessary burden to the employer and the employee, and it is our opinion that these problems should be faced honestly and squarely and without prejudice by all the groups involved.

Our investigation would indicate that these difficulties are due to four main causes:

1. There is a lack of coöperation and understanding between the medical profession and the representatives of insurance companies.

2. The second difficulty has been created in the past by failure of the Industrial Commission to interpret the law properly to the employee, thereby creating dissatisfaction in the mind of the doctor and misunderstanding in the mind of the employee.

3. Unethical and unfair practice of what we believe is a small group of physicians who have created an attitude of suspicion on the part of insurance companies as regards the integrity of the whole profession.

4. Finally, we believe that although the better insurance companies are anxious to be fair to the profession, by far the greatest cause of trouble is due to the fact that there are insurance companies who make it their practice as far as they can to cheapen the medical profession and to deal unfairly with the employee.

5. We therefore offer a resolution amending the By-Laws of the Minnesota State Medical Association.

By-Law.—Creating a committee to investigate and report on problems of the medical care of disabilities coming under Workmen's Compensation and other forms of disability compensable by insurance and its relation to the medical profession, insurance companies, and the Industrial Commission.

This committee shall consist of twelve members appointed by the president.

The first committee shall be appointed immediately following the adoption of this by-law. Four members shall serve until January, 1935; four until January, 1936; and four until January, 1937. The president shall apoint four new members each year. The secretary of the Minnesota State Medical Association shall be the secretary of this committee, and the chairman of the Committee on Public Policy shall be a member ex-officio of this committee.

This committee shall elect a sub-committee of five members to carry on routine affairs of the committee as they arise.

The duty of this committee shall be to act with representatives of insurance companies as an arbitration committee for all differences and controversies between members of the medical profession, insurance companies, and the Industrial Commission, and as far as possible establish rules, and regulations applying to this work which will be agreeable to all parties concerned.

To promote such other activities along educational and coöperative lines as they deem fit for the better handling of these mutual problems.

Respectfully submitted,
J. M. Hayes, *Chairman.*

Dr. F. H. Magney: We recommend that this be approved and referred to the Council with the following recommendations:

1. That the committee be called The Committee on Industrial Relations.

2. That in the second sentence of the first paragraph of the resolution, the following be substituted: "The secretary of the Minnesota State Medical Association, and the president, and the chairman of the Committee on Public Policy and Legislation shall be members ex-officio of this committee, and that adequate clerical help will be provided for this committee."

President Pearce: You have heard the report and the recommendations of our Reference Committee. The matter is now open for discussion. Is there anyone who wishes to make any comments on the proposal of this committee? If not, a motion to refer this report back to the Council will be in order.

Dr. A. H. Pedersen (Saint Paul): I so move.

The motion was regularly seconded.

Secretary Meyerding: I think that is one of the turning points in our whole economic situation, the fact that the doctors have gotten to the point where the State Association will at least confer with lay groups, sit around the table and discuss these matters, as we have.

I remember the first conference. I went over to the meeting with Herman Johnson. We did not get very far. Out of that meeting grew this conference where we are getting some place, whereby you will have a gentleman's agreement between these big corporations and yourself as to how your business shall be carried on. I think it is the turning point in our method of business.

President Pearce: Is there any further discussion? You have heard the motion to refer this back to the Council for action. All those in favor signify by saying "aye"; opposed "no." It is carried.

We have one other committee, one that I think has a most important matter in hand and that is the study and recommendations regarding the number of physicians to be licensed to practice medicine in Minnesota. I am going to ask Dr. Scammon, who is a member of that committee, to discuss this report.

Dr. R. E. Scammon: There are about 150,000 practicing physicians in the United States today. That is estimated, on the ratio of one physician to 1,000 individuals, as being about 25,000 in excess of the economic demand, or, if this conventional ratio is accepted, about one-sixth of the number.

At the present time, medical schools are graduating something over 5,000 students a year, and they are increasing their number of graduates. This is approxi-

matcly 50 per cent more than the number of physicians who, it is estimated, will die each ycar, and of the number of physicians who are needed to take care of the increase in population. For that reason, this committee was appointed to consider that matter.

It has had one meeting. In the state of Minnesota the number of physicians is about one for each 800 or 900 people, being higher than it is for any adjoining state or for the Province of Ontario to the north.

The committee found the problem extremely complicated. I think they were, as a whole, of the opinion that it was a problem that, if it was to be met at all, probably had to be met by states, because there are 104 licensing and graduating bodies for physicians in the United States today, with every possible background and habitude and interest behind them, whereas in the state of Minnesota there are but four, namely, the State Board of Medical Examiners, the Medical School, the Basic Science Board, and your Association. I think these four institutions can work in very close harmony.

We know that the situation has grown worse in the country at large, even since our meeting. The commercial school has commenced to open up. I am advised that a commercial school has been opened in Chicago, taking in classes of 400.

Therefore, the committee offers the following resolution, with the recommendation that, if it meets with the approval of the Council, it be offered for passage by the House of Delegates:

Resolved, First, that in the light of our present knowledge there are at this time in Minnesota an adequate number of licensed physicians to care for the health of the population.

Second, that under such circumstances it would be for the best interests of the public that the number of physicians licensed in the future should be so regulated so as to not exceed the present ratio of licensed physicians to population.

Third, therefore, the committee of the State Medical Association now organized for this purpose shall be directed to make a thorough study of the situation with a view to determining methods by which such curtailment of licensure as may be necessary can be brought about.

Fourth, that the secretary of the State Association is instructed to provide such clerical help as may be necessary in carrying out the project of this committee.

Fifth, that the findings and recommendations of this committee as approved by the Council shall be presented and urged upon all of those bodies (the four I mentioned above) who are now in control of the training and licensing of physicians in Minnesota.

Dr. F. H. Magney: We recommend that the committee endorse the report of the Committee to Study Limitation of the Number of Physicians, and move the adoption of the resolution contained therein.

President Pearce: Gentlemen, you have heard the comments of Dr. Scammon on this report. I think they are familiar to you. You have heard the recommendation of the Reference Committee. Is there any discussion? If not, a motion to refer this back to the Council for action will be in order.

Dr. C. L. Scofield (Benson): I so move.

The motion was regularly seconded.

President Pearce: It has been moved and seconded that the report of this committee, which will include the endorsement of the House of Delegates, be referred back to the Council for action. All those in favor of the motion signify by saying "aye"; opposed. It is so ordered.

The next order of business is the report of the Committee on Cancer by Dr. Robertson.

Dr. H. E. Robertson read the report of the Committee on Cancer.

REPORT OF COMMITTEE ON CANCER

During the past year, at the invitation of the Council of this Association, the American Society for the Control of Cancer, represented by Dr. F. L. Rector, completed a survey of the state, in which the situation in this state concerning the occurrence, mortality and general facilities for the diagnosis and care of cancer patients were tabulated. The report of this survey has just been completed and a copy of the recommendations are herewith enclosed.

Your committee recommends:

1. That the Minnesota State Medical Association extend to the American Society for the Control of Cancer through its managing director, Dr. C. C. Little, thanks for the painstaking and thorough work carried on by Dr. Rector, as well as his effort at constructive and helpful suggestions.

2. That the recommendations made in this report be studied by a special committee composed of representatives from (a) the State Committee for the American Society for the Control of Cancer, headed by Dr. O'Brien; (b) the College of Medicine, University of Minnesota, and the Extension Division of the University; (c) the State Department of Health; (d) the Cancer Committee of the State Medical Association; these representatives to be called into meeting by the president of the State Medical Association, through its secretary, Dr. Meyerding, and that this committee after consideration of the items in this report make recommendations through its representatives to the component organizations as to the portion of coöperative effort which it seems best should be undertaken by each.

In conclusion, your committee desires to re-emphasize the enormous and growing importance of this subject, not only to the profession of this state, but to laity as well. We are convinced that this disease has passed beyond the borders of individual medical control and practice and our Association can no longer refuse to accept leadership in meeting the questions which this problem has raised.

H. E. Robertson, *Chairman.*

FINAL PAGES OF CANCER SURVEY OF MINNESOTA

By Dr. F. L. Rector, for the American Society for Control of Cancer

The following recommendation are made for an improved cancer service in Minnesota:

1. Special cancer services, or their equivalents, to meet the minimum standards of the American College of Surgeons should be organized in Duluth, in the Minneapolis General Hospital, Minneapolis, Ancker Hospital, Saint Paul, and such other Minneapolis and Saint Paul hospitals as can meet the minimum standards and provide properly trained personnel.

2. The organization of special cancer services in other cities would depend upon their ability to meet the requirements of the American College of Surgeons and to provide competent personnel. Such communities should be encouraged to offer as complete a service for the diagnosis and treatment of cancer as their facilities permit. These diagnostic centers should serve as headquarters for local cancer committees and should be supplied with educational material of interest to the medical profession and the public.

3. The facilities of the Cancer Institute of the Minnesota General Hospital, Minneapolis, should be expanded to care for all patients referred for diagnosis and treatment without undue delay. The addition of a deep therapy machine of at least 200 kv. capacity and an amount of radium in suitable containers to increase the supply to 1,000 mg. would doubtless meet the need for some time to come.

4. Those in charge of the work at the Cancer Institute should study their problems to determine if the available material is serving its fullest possible use as teaching material, and if the undergraduate student body is obtaining the maximum educational benefit from this material.

5. During each year there should be offered to the physicians of Minnesota at least one short postgraduate course in cancer diagnosis and treatment by the staffs of the Minnesota General Hospital and Cancer Institute and other recognized authorities in the cancer field.

6. A comparable and adequate record system should

be developed for hospitals accepting cancer patients for diagnosis and treatment. The record forms of the American College of Surgeons are recommended to the favorable consideration of institutions undertaking this work.

7. There should be an adequate staff of medically trained social workers connected with the diagnostic and treatment institutions whose primary function would be to follow up cancer patients. These workers should coöperate fully with the clinical and record departments of the institutions with which they are connected.

8. The general hospitals of Minneapolis and Saint Paul should undertake a coöperative effort to follow all cancer patients for a period of at least five years. This undertaking might well include a survey of the cancer records of each hospital for the previous five years so that at the end of the five year period the fullest possible information on these patients over a ten year period would be available. A similar follow-up system might well be developed by the Mayo Clinic.

9. Each Minnesota hospital admitting cancer patients should appoint a cancer committee of the staff to consider problems and improve facilities for diagnosis and treatment of these patients.

10. The Minnesota State Medical Association should appoint a permanent cancer committee with a minority of its membership changing in any one year. This committee should be representative of all sections of the state and membership might be based on the councilor districts. This committee should work in close coöperation with the faculty of the University Medical School, with the local and special medical organizations, with other agencies interested in cancer prevention and control, and with the state and local committees of the American Society for the Control of Cancer. The cancer committee should be especially charged with the responsibility of bringing before the profession of the state the latest authentic information on the diagnosis and treatment of cancer and the development of more uniform methods of procedure in the handling of these cases.

11. At least one meeting each year of each local and district society should be devoted to cancer. This plan might well be projected for a five year period with different phases of the cancer problem stressed throughout the state for a year each. One session of each annual meeting of the state association should likewise discuss cancer questions and there should be an exhibit on some phase of the cancer problem at each annual meeting.

12. The Minnesota State Medical Association should extend its coöperation with the Medical School and the Extension Division of the University for cancer educational work among medical and lay groups. A program should be developed to bring cancer actively to the attention of every practicing physician in the state. In coöperation with the State Department of Health and the State Committee of the American Society for the Control of Cancer, an educational program for the general public should be organized.

13. The Minnesota State Medical Association should give serious consideration to the lack of facilities found in many hospitals of the state for the examination and interpretation of tumor tissues, and to the provision of facilities whereby such examinations can be made with the greatest benefit to the patient and the physician.

14. Hospitals which now permit removed tissues to be discarded without examination should be discouraged in this practice.

15. In the Department of Pathology, University of Minnesota, there might well be developed a tumor registry in which would be filed tissues, slides, histories, and concise descriptions of tumors removed in the hospitals of Minnesota. This material should be available to physicians and others interested in the study of malignancy.

16. There should be developed in the State Department of Health a Division of Cancer Control with adequate personnel and budget to make possible the carrying out of studies in the prevention and control of cancer, the analysis of hospital records, of autopsies, of death certificates, and of other information pertinent to this question. The director of this division should be a physican who has had clinical or other experience with cancer problems. The activities of this division should not enter into treatment of cancer in any form, but should be educational in character and as helpful as possible to physicians and hospitals in their work with malignancy.

17. The Minnesota State Cancer Committee, functioning under the auspices of the American Society for the Control of Cancer, should be enlarged by the addition of representative and influential medical and lay members. Local committees of similar composition should be formed in Duluth, Minneapolis, and St. Paul with the approval and endorsement of their county medical society. The function of these committees should be to arouse and maintain a sane and constructive interest in cancer prevention and control in their various communities. Wherever possible, they should assist in the work of the organized cancer services in their community. They should serve as centers of information on cancer problems, coöperate with all other health and educational forces in their communities for the prevention and control of cancer, and assist the state committee whenever called upon to do so. Local committees should be formed in other communities when there is need for the support of local cancer work.

18. It is believed that the needs of the cancer situation in Minnesota will be met by the development of organized cancer services along the lines mentioned. It is realized, of course, that cancer cases will continue to be seen and treated in hospitals not equipped for cancer therapy and by physicians in their offices. It would be well when cancer cases are encountered by institutions and physicians not equipped to give adequate service that they be referred for treatment to hospitals and physicians who are so equipped. In any event, an adequate record of the case should be kept and a follow-up in keeping with the recommendations made herein should be carried out. In the present status of cancer therapy, it is doubtful if an institution should undertake to treat cancer unless there are available adequate facilities for the diagnosis, therapy, record keeping, and social service follow-up work.

19. It is believed that these recommendations for an improved cancer service in Minnesota can be brought into play most effectively through the coöperation of the Minnesota State Medical Association, as representative of the clinical and educational phases of medicine in the state, the State Department of Health, and the Minnesota Committee of the American Society for the Control of Cancer in a tripartite organization for cancer control. This coöperative group could weld into a strong working organization the cancer control facilities in the state to the end that all cancer patients could receive acceptable and adequate treatment in the earliest possible stage of the disease, which stage offers the greatest hope of permanent relief. The organized facilities would offer also an unexcelled opportunity for undergraduate and post-graduate education in the field of cancer diagnosis and therapy, a field that needs intensive cultivation if the best service is to be rendered to sufferers from this disease. The effective working of such an organization would make unnecessary the entrance of any other agency, particularly any governmental agency, into the field of cancer prevention and control in Minnesota. The contribution which each member of this tripartite organization would make and the problems on which they would coöperate in the suggested program are indicated in the following pages.

20. There is appended to this report a short bibliog-

raphy of books and journals on various phases of cancer. This reading list is recommended to physicians, medical societies, and hospitals as a minimum of published material from which authentic information can be obtained on various cancer subjects.

PROGRAM OF TRIPARTITE ORGANIZATION FOR CANCER PREVENTION AND CONTROL IN MINNESOTA

A. Minnesota State Medical Association

1. The Minnesota State Medical Association, cooperating with the Medical School and Extension Division of the University, should concern itself with the education of the physicians of Minnesota in the most approved methods of diagnosis and treatment of cancer and allied diseases.

2. It should coöperate with hospitals and other organizations to see that adequate facilities are provided and acceptable treatment rendered to cancer patients coming to these institutions.

3. It should stimulate the provision of adequate laboratory facilities for the examination and interpretation of all tumor tissues removed in the hospitals of Minnesota.

4. It should stimulate its members promptly to refer cases which they do not diagnose or care to treat to institutions and to specialists interested in such cases.

5. It should endeavor to secure better histories and records of the treatment of cancer cases and to obtain more accurate statements on death certificates as to the cause of death.

6. It should encourage its members to read papers on cancer subjects at local and state society meetings.

7. It should supply its members with reliable statistics tending to show the value of early diagnosis and early adequate treatment.

B. State Department of Health

1. The State Department of Health in Minnesota should make surveys to determine the character and extent of the cancer problem within its territory as to the actual number of cases and deaths.

2. It should compile statistics from hospital records and the tabulation of cancer deaths by age, sex, organ, type of lesion, and of the time elapsing between the patient's first knowledge of the disease and his seeking medical attention.

3. It should make surveys of the hospital, nursing, and other services for cancer patients in Minnesota.

4. In coöperation with the State Medical Association, welfare, and economic organizations, it should make studies of the economic problems involved with the cancer patients in Minnesota.

5. In coöperation with the State Medical Association it should stimulate the provision of proper facilities for the examination of tumor tissue in the hospitals of the state.

6. In coöperation with the State Medical Association it should provide for interesting and informative articles on the question of cancer control for distribution to the laity.

7. It should estimate periodically the amount and quality of cancer service given in the state on the lines laid down in the Appraisal Form of the American Public Health Association.

8. It should coöperate with the Minnesota State Committee of the American Society for the Control of Cancer in its work of education of the public regarding early signs and symptoms of cancer and the value of early, adequate treatment.

C. Minnesota State Cancer Committee

1. This committee should coöperate with the Minnesota State Medical Association and the State Department of Health in the activities suggested for these two organizations under this tripartite arrangement.

2. It should assist in educating the public in the early signs and symptoms of cancer and the value of early diagnosis and early, adequate treatment.

3. It should assist the public in ways and means of seeking skillful attention in the treatment of this disease.

4. It should teach the public the value of periodic examination as means of detecting cancer in its early and most hopeful stage.

5. It should educate responsible individuals in Minnesota to the value of adequate facilities for the early diagnosis and treatment of cancer and should urge upon them the provision of funds when and where needed to supplement existing facilities for use in controlling this disease.

6. It should take a prominent part in the raising of funds to carry out the program developed by this tripartite organization for cancer control.

7. It should coöperate with all voluntary health and welfare agencies in all their constructive activity relating to cancer.

8. It should keep fully advised of the policies and program of the American Society for the Control of Cancer, of which it is the local representative, and should avail itself of all the facilities the parent society has to offer. It should furnish the Minnesota State Medical Association and the State Department of Health with educational material from the parent society and should keep the society's field representative, responsible for the work in that territory, fully advised of its activities.

DR. F. H. MAGNEY: The Reference Committee commends the careful and painstaking report made by the Committee on Cancer. If the various suggestions were adopted, our knowledge of the subject of cancer would be greatly increased.

The question arises, however, whether the work of the committee would not merit financial support, and we would recommend this for consideration by the Council.

PRESIDENT PEARCE: You have heard the comments of the chairman of the committee that has made a very painstaking and splendid report, one that deserves a great deal of commendation on the part of our House of Delegates. You have heard the recommendation of the Reference Committee by Dr. Magney. Is there any discussion on this report?

DR. F. J. SAVAGE (Saint Paul): It seems to me, with the increasing death rate from cancer, which has now reached the second largest cause of death in Minnesota, and in view of this exceedingly excellent report of Dr. Rector, and the recommendations of the Reference Committee, this committee cannot function properly unless they have money at their disposal.

I would like to ask Dr. Robertson how much he thinks would be advisable to put on this campaign of education for the coming year, how much he thinks it would be advisable for his committee to have.

Dr. Robertson, how much does your committee need to function properly for another year?

DR. ROBERTSON: We don't need any money.

DR. SAVAGE: That's fine.

PRESIDENT PEARCE: Is there any further discussion of Dr. Robertson's report? If not, it will be considered as the sense of the House of Delegates that this report be referred back to the Council for action.

The next order of business is the report of the Inter-Professional Relationships Committee. Is there any report from the Inter-Professional Relationships Committee?

DR. F. H. MAGNEY: Dr. Taft is sick. There is no report.

PRESIDENT PEARCE: Report of the Committee on Diabetes. Dr. Wilder.

REPORT OF COMMITTEE ON DIABETES

1. The incidence of diabetes in Minnesota as well as in the registration area of the United States is on the increase. The present mortality rate in Minnesota per 100,000 of the population is 22.37 (1932). The av-

erage rate for the five years, 1928 to 1932, inclusive, was 20.3, and that for the five year interval, 1915 to 1919, inclusive, was 15.8. The mortality rate for tuberculosis in 1931 was 41.42, from which it may be seen that more than half as many people are dying with diabetes as with tuberculosis.

Data compiled by the Metropolitan Life Insurance Company indicate that the increase in mortality from diabetes is due in part to the increasing numbers of older persons in the community, especially older women. The data indicate a slight decrease for the first four decades which is overbalanced by the increase for later decades. The 1931 Minnesota statistics show a marked predominance of females in deaths from diabetes after the age of forty.

2. Questionnaires were sent to the physicians who signed the death certificates in the 547 deaths attributed to diabetes in 1931; 375 replies were received. From these replies it appears that 28 per cent of these individuals died from uncomplicated diabetes. Furthermore, 10.5 per cent of all the deaths from diabetes in 1931 were in the first four decades of life. The present treatment of diabetes, if properly administered, is of such effectiveness that these deaths are avoidable. No one need die today of uncomplicated diabetes, and the mortality among diabetics in the first four decades of life ought not to exceed that of a similar age group in the population at large. That the experience in Minnesota is not unique is indicated by the data of the Metropolitan Life Insurance Company, which shows only a slight decrease in the death rate of young diabetics since the discovery and introduction of insulin.

3. The conclusion from the above is that diabetes is poorly treated over the country at large. Our data do not indicate that the situation is worse in Minnesota than elsewhere, nevertheless it could be greatly improved. The inadequacy of its present management is further attested by the fact that more than half of the cases dying of uncomplicated diabetes (diabetic coma) received no insulin in their final illness.

4. This poor treatment may be attributed to:
   (a) Ignorance or indifference on the part of patients. The replies received from the questionnaires indicate dependence on quacks, on patent medicines or Christian Science in a number of instances.
   (b) Inability to secure insulin. In 75 of the 375 deaths in which information was obtained the individual could not buy insulin. In forty-five cases (twenty-eight in hospitals) it was supplied by charitable agencies; 125 cases received no insulin at any time and forty-seven had none in their final illness.
   (c) Lack of knowledge about the treatment of diabetes on the part of the profession. This is indicated by:
      1. The small percentage of patients who had been taught the technic of urinalysis—55 per cent of the 375.
      2. Thirty-nine patients using insulin with no attempt at control of the diet.
      3. Only 39 per cent of the 375 patients on measured diets (147 cases).

RECOMMENDATIONS

1. That facilities be provided either by the state or through charitable agencies to provide insulin free of charge to those needing it but unable to pay for it. It would seem best to distribute such insulin only on the request of the physicians in charge of such cases.

2. That arrangements be made with the holders of the patents on insulin to place the manufacture of insulin on a non-profit making basis so that it will be available at the cost of production to all who need it. Failing this that arrangements be made by the state or state university to buy insulin at the cheapest possible wholesale rate and dispense it at a price sufficient only to cover the cost of purchase and distribution.

3. That the State Medical Association engage in a systematic campaign of advertising in the public press and by radio, calling attention to the present satisfactory methods of treating diabetes and warning against quacks and patent medicines. Such advertising should instruct the reader to write to the secretary of the State Medical Association for pamphlets which would provide additional information. The Committee on Diabetes is prepared to submit copy for such a pamphlet. The material contained would tell the story of diabetes and the discovery of insulin, and outline in general terms the principles of satisfactory management. It would dissuade the reader from reliance on untried methods of treatment and urge his placing his case in the hands of the physician. This matter could properly be referred to the Committee on Public Health Education.

4. That every physician in the state be provided with literature in the form of a pamphlet which would acquaint him in the simplest and most practical manner possible with an approved technic for the handling of these cases. Copy for this pamphlet will be provided by the Committee on Diabetes.

It is suggested that the funds necessary for this enterprise might be made available by the United States Reconstruction Corporation, that the life insurance companies might also be interested, or that state aid may be obtained. Specific recommendations relative to ways and means will be submitted later.

Yours very truly,
RUSSELL M. WILDER, *Chairman.*

DR. R. M. WILDER: The diabetes mortality in this state and the country at large is increasing at a phenomenal rate. For instance, we have the figures for the five-year period between 1915 and 1919. Then the rate was 15.8 per cent. In the last five years it has risen to 22.37 per cent. This represents a 40 per cent increase in the rate of mortality from this disease, and brings this disease into a position of considerable public health importance. The actual number of people dying with diabetes this last year, in the state of Minnesota, was nearly 550.

An inquiry into the exact cause of death of these 550 people was desired, and the attention of the council was called to the problem. In consequence, this committee was appointed at the last meeting of the Council three months ago, and as a result of that I am speaking to you now.

The committee, having had but a short time to function, has as yet made relatively little progress. They have, however, analyzed the deaths from diabetes in 1931, receiving the death certificates from the secretary of the State Board of Health, and writing or sending questionnaires to the doctors who signed those death certificates.

It appears from this analysis that 28 per cent of these patients died with uncomplicated diabetes, and that 10 per cent of them were individuals under thirty years of age. This means that 167 unnecessary deaths occurred in our state in that year because with the present, well developed methods of treating diabetes, there is no excuse for people dying of uncomplicated diabetes, nor for young people dying of diabetes in a proportion larger than they would be expected to die.

More than half of these people had no insulin at all, at any time in the course of their disease. These facts, together with this increased mortality from diabetes, despite this great discovery that has placed at our hands a means of controlling diabetes, is a matter of public health concern and one with which the State Medical Association should be occupied.

It must be concluded from this analysis, short as it is, that the people at large are not receiving the benefit that the laboratory work in the development of insulin should give them.

Poor treatment can be attributed, first, to ignorance or indifference on the part of people; second, to inabil-

ity, on the part of those in poor economic circumstances, to buy insulin; third, very definitely, to a lack of knowledge on the part of the profession as to a suitable and approved method of treatment of diabetes.

The committee therefore has made certain tentative recommendations.

It is clear that much of the poor treatment of diabetes is by physicians who do not attend either the State Medical Association meetings or their county meetings. It is clear, from experience in other states, that it is extremely difficult to get specific information regarding new methods of treatment into the heads of such men.

It seems to us that by educating the public we may perhaps exert pressure on the physician to acquaint himself with what is to be expected of him. Then if we provide him with facilities for learning about it, we will really accomplish something definite.

The condition in Minnesota is no worse, judging from the Metropolitan Life Insurance Company's statistics, than that in other parts of the country. The data I have given you indicate, I feel sure, that considerable improvement can be made.

Ways and means to carry out these recommendations to pay for this literature we propose distributing, must be found, and this has not as yet been done. Therefore, it is proposed that you refer this matter to the Council with power to act, in case our committee is able, before the next annual meeting, to arrive at some definite proposals for action.

Dr. F. H. Magney: The Reference Committee recommends the acceptance of this report and recommends that the matter of costs involved be referred to the Council for action.

President Pearce: You have heard the recommendation. Is there any discussion on Dr. Wilder's report? If there is no discussion, I would like to have a motion referring this back to the Council as recommended by the Reference Committee.

Dr. A. B. Stewart (Owatonna): I make such a motion.

The motion was regularly seconded.

President Pearce: It has been moved and seconded that the report be referred back to the Council for whatever action is necessary. Those in favor signify by saying "aye"; opposed "no." It is carried.

The next order of business is to find out if the Committee on Credentials has any more credentials.

Dr. C. A. McKinlay: It has received no others.

President Pearce: We now have received the credentials of forty-five delegates. The total delegates will be fifty-eight. We have a good representation.

The next is correspondence and announcements.

Dr. F. H. Magney read a letter and resolution received from the Medical Association of Georgia.

President Pearce: This letter is right on the point of the committee on which Dr. Scammon reported. I think probably the best way to handle it would be to refer it to that committee for answer.

Dr. W. H. Coventry (Duluth): I make such a motion, Mr. President.

The motion was regularly seconded.

President Pearce: It has been moved and seconded that this letter be referred to the Committee on the Number of Physicians to be Licensed in the State of Minnesota. Those in favor of the motion signify by saying "aye"; opposed "no." It is carried.

Secretary Meyerding made several announcements.

President Pearce: The next order is unfinished business. There are certain amendments to the Constitution and By-Laws. Dr. Meyerding, will you read those?

Secretary Meyerding: These are amendments to the Constitution lying over from last year. They were published in my report and also sent out individually. The first amendment:

Article IV, Section 4.—Affiliate (that is a new word, substituted for emeritus) members shall be those members of component district or county medical societies (this is new) who upon their own request, and having held membership for a period of twenty-five years in this Association, and having reached the age of seventy years (the sixty-five is changed to seventy years), or who through physical disability are unable to engage in active practice, and who ("upon their own request to their district or county society" is taken out) shall have been declared affiliate members of their own district or county medical society at its regular meeting, such action having been approved by the Council.

President Pearce: This was presented a year ago. According to the Constitution, an amendment to the Constitution must lay over one year.

This change in the Constitution really does nothing but raise the age limit from sixty-five to seventy.

Secretary Meyerding: And the members must make the request themselves.

President Pearce: What is your pleasure with this amendment?

Dr. A. J. Lewis (Henning): I move that it be adopted.

The motion was regularly seconded.

Dr. A. G. Schulze (Saint Paul): It will be necessary for the component societies to change their constitutions to harmonize with this, won't it?

President Pearce: Yes. Is there any further discussion? It has been moved and seconded that this change to the Constitution be adopted. All in favor signify by saying "aye"; opposed "no." It is carried.

Secretary Meyerding: *"Article V: House of Delegates.*—The House of Delegates shall be the legislative and business body of the Association and shall consist of (1) Delegates elected by the component county and district societies, (2) Councilors, (3) the President, (4) the President-Elect, (5) Ex-officio Secretary and Treasurer, (this is new) (6) Past Presidents who shall be entitled to the privileges of the floor but without the right to vote."

Dr. E. S. Boleyn (Stillwater): I move the adoption of that.

The motion was regularly seconded.

President Pearce: You have heard the motion. Is there any discussion? Those in favor signify by saying "aye"; opposed "no." It is carried.

Secretary Meyerding: *"Article VI: Council."*—The only change is adding "the immediate Past President" to the Council. It reads: "The Council shall consist of the Councilors, the President, the President-Elect, the immediate Past President, and ex-officio the Secretary and the Treasurer. Besides its duties mentioned in the By-Laws, it shall constitute the Finance Committee of the House of Delegates. A majority of Councilors shall constitute a quorum."

Dr. W. H. Coventry (Duluth): I move the adoption of that.

The motion was regularly seconded.

President Pearce: You have heard the motion to adopt this change in the Constitution. All in favor signify by saying "aye"; opposed "no." It is carried.

Secretary Meyerding: We have the application from the Olmsted-Houston-Fillmore County for a new charter. The Olmsted County Society has turned in their charter and the Houston-Fillmore cannot find theirs. If the Olmsted County would like this charter back, and they have some place to keep it as a souvenir, we will be glad to return it. The application is from the secretary, Dr. Piper, for a charter for the Olmsted-Houston-Fillmore County Medical Society.

President Pearce: A motion granting the charter is in order.

Dr. W. H. Coventry: I move they be granted a charter.

The motion was regularly seconded.

President Pearce: Is there any discussion? All those in favor of the motion signify by saying "aye"; opposed "no." It is carried.

SECRETARY: We have the following applications for Associate membership. These have all been members of their local societies and have been voted upon by the Council:

Richard M. Hewitt, Rochester
Esther M. Greisheimer, Minneapolis
Irvine McQuarrie, Minneapolis
Hobart A. Reimann, Minneapolis

PRESIDENT PEARCE: A motion granting these people Associate membership is in order.

DR. F. H. MAGNEY (Duluth): I so move.

The motion was regularly seconded.

PRESIDENT PEARCE: Is there any discussion? All in favor signify by saying "aye"; opposed "no." It is carried.

DR. F. H. MAGNEY: Here is a resolution with a note "From the desk of Dr. F. E. Harrington:"

"WHEREAS, The prefix 'Doctor' or its abbreviation 'Dr.' to the name of any person conveys no specific idea; and

"WHEREAS, Colleges and universities may, by charter, bestow a doctorate in divinity and the sciences; and

"WHEREAS, The prefix 'Doctor' or its abbreviation 'Dr.' has been adopted by persons not holding a doctor degree; and

"WHEREAS, The prefix when used by graduates in medicine and those licensed to practice medicine, surgery and their specialties does not convey the science which such persons practice; now therefore be it

"RESOLVED, That it is the sense of the Minnesota State Medical Association that wherever the names of its members are written or printed they be designated by the suffix 'M.D.' as Doctors of Medicine in order to convey the fact that they have honorably completed the course of study and have been graduated and awarded the degree 'Doctor of Medicine.'

"Done at the City of Rochester this — day of May, 1933."

DR. H. M. WORKMAN (Tracy): I move its adoption.

PRESIDENT PEARCE: Is that just a resolution?

DR. F. H. MAGNEY: Yes.

Dr. Harrington's resolution relative to using the title, "M.D." in preference to the title "Dr." is referred to the House of Delegates without comment and for their discussion.

PRESIDENT PEARCE: You have heard the resolution. Is there any discussion?

DR. COVENTRY: I move its adoption.

DR. WORKMAN: I second the motion.

PRESIDENT PEARCE: All in favor signify by saying "aye"; opposed "no." It is carried.

We now come to the next to the last order of business and that is new business. Has anyone anything?

DR. W. W. WILL (Bertha): So far as I know, if any of the medical men become entangled in legal questions they probably will be glad to have a legal adviser, and one that is worthy of that title. I haven't personally become involved, but I have personal knowledge of a matter that our legal representative took care of, after the legal profession in our community were not able to cope with it. We had one colored practitioner up there, or "quack" is a better term. All the legal profession could do was to get him into court, but Mr. Brist successfully put that man where he belonged. I would like to present this as a resolution before this body:

"Be it hereby RESOLVED, the Council and the House of Delegates express their satisfaction and confidence in Mr. Manley Brist as the authorized legal adviser of the Committee on Public Policy and Legislation and the State Board of Medical Examiners."

I move the adoption of that resolution.

The motion was regularly seconded.

PRESIDENT PEARCE: Is there any discussion? All in favor of the resolution as offered by Dr. Will say "aye"; opposed "no." It is carried.

MR. F. MANLEY BRIST: I would like to express my sincere appreciation of that endorsement.

PRESIDENT PEARCE: Is there any other new business to come before the House of Delegates?

DR. F. H. MAGNEY: There is an amendment to the By-Laws, *Chapter 9, on Committees, Section 1:* "The President and the Secretary shall be ex-officio members of all committees. The standing committees shall be as follows, and appointed by the President unless otherwise provided," and then the names of the committees are to follow. That is presented this year to be voted on next. Isn't that right?

PRESIDENT PEARCE: That is merely a matter of presenting a proposed amendment to the By-Law that will have to lay over until the Tuesday meeting. Is there any other business?

DR. H. M. WORKMAN: There is one matter I would like to call to the attention of the House of Delegates. This matter has been called to my attention, and I think it is of some importance. It is a case where we were very much interested in a legal way. The wife of a judge before whom we had a very important case pending, went to a doctor's office. For some reason unknown to me (it may have been a very good explanation) she had to sit there and wait three hours before the doctor would see her. It might have been all right if she was some mechanic's wife but it did not go very well with the judge. If we would only give attention to cases of that kind it might help us in court.

PRESIDENT PEARCE: Is there any other business to come before the House?

DR. COVENTRY: Would it be in order to accept the report of the president as given this evening? I think it should be on the record.

PRESIDENT PEARCE: Has anyone anything else they would like to bring up before the House of Delegates this evening? If there is no other business, a motion to adjourn will be in order.

DR. H. M. WORKMAN: I move that we adjourn.

The motion was regularly seconded, and the meeting adjourned at eleven-thirty o'clock.

Second Session of the House of Delegates

Tuesday Afternoon, May 23, 1933

The second session convened at twelve-fifty o'clock, President Pearce presiding.

PRESIDENT PEARCE: The House will come to order.

The secretary will call the roll.

Secretary Meyerding called the roll.

PRESIDENT PEARCE: The first matter of business to come before this meeting of the House of Delegates is the summary of the minutes of the previous meeting.

Secretary Meyerding read the summary of the minutes of the meeting held Sunday evening, May 21, 1933.

PRESIDENT PEARCE: Are there any corrections to these minutes? If there are no corrections, the minutes will stand approved as read.

We will now have the report of the Council by Dr. Workman.

Dr. Workman read the report of the Council.

REPORT OF THE COUNCIL

The second meeting of the Council of the Minnesota State Medical Association was held at the Kahler Hotel, Monday, May 22, 1933, at 12:30 P. M.

The following were present: N. O. Pearce, H. M. Workman, W. A. Coventry, O. J. Hagen, F. J. Savage, W. W. Will, L. Sogge, J. S. Holbrook, J. M. Hayes, and E. A. Meyerding.

Guest: S. H. Boyer.

The meeting was called to order by the chairman, Dr. H. M. Workman.

Motion was made, regularly seconded and carried that Dr. Horace Newhart of Minneapolis be appointed chairman of the Hard of Hearing Committee, Dr. Newhart to have the privilege of appointing the other members, not exceeding three.

The following committee to confer with the State Board of Control was appointed: H. M. Johnson, T. H. Sweetser, N. O. Pearce, O. E. Locken, and W. W. Will.

With regard to the request of the Radio Committee and the recommendation of the Reference Committee that the preparation of placards to be placed in physicians' reception rooms showing the broadcasting time of Dr. W. A. O'Brien, motion was made, seconded and

carried instructing the secretary to have such placards printed and distributed.

In regard to the recommendation of the Committee on Public Policy and Legislation and the Reference Committee, which is as follows: "We would call attention to the recommendation that the modification of the medical practice act should be made which would give the Board of Medical Examiners the power to suspend a license and reinstate it at their discretion." The Council will take up this matter with the Committee on Public Policy and Legislation at the proper time.

Motion was made, seconded and carried that the recommendation of the Reference Committee that the Council invite the Committee on Medico-Legal Affairs to sit in consultation with them, be referred to the Committee on University Relations and report back to the Council at its next meeting. The Committee on University Relations to act in conjunction with the Medico-Legal Affairs.

With regard to the report of the Committee on Public Health Nursing and the recommendation of the Reference Committee, the Council instructed the secretary to forward the following resolution to the State Board of Medical Examiners: "That the State Medical Association go on record as opposed to public health nurses entering into the field of medicine."

The appointment of the Committee on Industrial Relations was accepted by the Council.

The report of the sub-committee of which S. Marx White is chairman, was referred to the Medical Economics Committee.

The Council referred the report of the Committee on Regulation of Number of Physicians Licensed to Practice Medicine in Minnesota, to the Medical Economics Committee for further report.

The Council will work with the chairman of the Cancer Committee and assist him in every way possible.

With regard to the report of the Committee on Diabetes, the Council will coöperate with the chairman.

The Council instructs that the following resolution be sent to the State Board of Medical Examiners:

"Be it hereby Resolved that the Council and the House of Delegates express their satisfaction and confidence in Mr. Manley Brist as the authorized legal advisor of the Committee on Public Policy and Legislation and the State Board of Medical Examiners."

Motion was made, seconded and carried that the secretary be authorized to make arrangements for the temporary engagement of a part time assistant for the purpose of attempting to organize some counties in the care of the indigent, this arrangement subject to the approval of the Council.

Motion was made, seconded and carried that the Council meet six times a year. The dates to be left to the discretion of the chairman of the Council and the secretary of the State Association.

Motion was made, seconded and carried that the committees now existing in the Association, and all future committees that have to do with medical economics, be Council committees, to be appointed and organized by the Council and to report to the Council.

The chairman of the State Health Relations Committee appeared before the Council and the following action was taken: "Motion made, seconded and carried that Dr. Sweetser obtain an opinion from the Attorney-General on all plans that he has for the care of the indigent, and they to meet with the Council in the Fall with definite plans."

The meeting adjourned.

President Pearce: What will you do with the report of the Council?

Dr. W. H. Coventry (Duluth): I move its acceptance.

Dr. E. S. Boleyn (Stillwater): I second the motion.

President Pearce: Is there any discussion? If there is no discussion, all those in favor will signify by saying "aye"; opposed. It is carried.

The next order of business is the election of officers. At this time we are to elect a new President, First Vice President, Second Vice President, Secretary and Treasurer, and the Councilors whose terms expire at this time.

The first office to be considered is that of president. We will now accept nominations for president of this Association.

Dr. B. S. Adams (Hibbing): I wish to present in nomination a man I have known for so many years and so intimately that I feel certain of his honesty and his integrity. We were classmates at University and dissected at the same table.

Since our graduation, I have kept in intimate contact with him and know somewhat the sort of man he has been. Not only is he an upstanding man in his community, but he is a physician of the type that we all admire, capable, faithful and conscientious. He has always lived up to the highest tenets of our profession, and his constant endeavor has been to uphold the practice of medicine on the highest standard possible, not only as an art, not only in its scientific objectives but also in its humanitarian aspects of bringing comfort to those in distress and affliction. He has done much for our state medicine. His many years of service and training have well prepared him for the duties of this office. He is a past president of Ramsey County; for many years he was a member of the House of Delegates, and he is now serving his third term as Councilor. He has made contacts with our legislative affairs and knows somewhat of the difficulties and troubles, from several years' membership on the Legislative Committee, one year of which he was chairman. He was on the committee which revised our state Constitution.

He was the first chairman of the Committee on Public Health Education. He is familiar with the present challenge to our profession, and he is not unaware of the economic conflict which is facing us. He deprecates the tendency toward state medicine, and particularly those endeavors on the part of others to commercialize medicine and to lower our standards. He has stood shoulder to shoulder with those who have done valiant work for our organization. He knows better than most men what has been done in the past, and he is familiar with our program that is outlined for the present and immediate future. His concept of our needs for many years to come is clearer than most men possess.

Endowed with a generous amount of good common sense, a keen insight into affairs, a clear vision, an unusual executive ability, and a rare capacity for detail, he is well fitted for the office of president.

I take pleasure in nominating a man of high idealism, a man who has the courage of his conviction, a man who has been tried and not found wanting—Frank J. Savage of Saint Paul.

Dr. E. S. Boleyn: I subscribe to what Dr. Adams has said about Dr. Savage, only I feel sure he would never condemn a man without a fair hearing. I wish to second the nomination.

President Pearce: Are there other nominations for president?

Upon motion regularly made and seconded, the nominations for president were closed.

President Pearce: A motion for the secretary to cast the ballot for president is in order.

Dr. E. S. Boleyn: I so move.

The motion was regularly seconded.

President Pearce: It has been moved and seconded that the secretary cast the unanimous ballot for Dr. Savage for president. All in favor of that motion signify by saying "aye"; opposed. It is carried.

Secretary Meyerding: The secretary hereby casts the unanimous ballot for Frank Savage as president for the ensuing term.

President Pearce: The next order of business is

the election of a first vice president. We will now accept nominations for first vice president.

Dr. S. A. Slater (Worthington): I wish to place in nomination the name of a man from the southeastern part of the state. He is a man well fitted and worthy of the honor. This man is Dr. Andrew Gullixson of Albert Lea.

The nomination was regularly seconded.

President Pearce: Are there any further nominations for first vice president?

Upon motion regularly made and seconded, the nominations for first vice president were closed.

President Pearce: A motion instructing the secretary to cast the unanimous ballot will be in order.

Dr. W. G. Paradis (Crookston): I so move.

The motion was regularly seconded, put to a vote and carried.

Secretary Meyerding: The secretary hereby casts the unanimous ballot for Dr. Andrew Gullixson of Albert Lea as first vice president.

President Pearce: We now come to the nomination of second vice president. The chair will now receive nominations.

Dr. F. J. Lexa (Lonsdale): I would like to place in nomination from Rice County, from Faribault, a man who has been active in various organizations, a young man, and I think he would be well fitted for the position. He is Dr. C. M. Robilliard of Faribault.

The nomination was regularly seconded.

President Pearce: Are there any other nominations for second vice president?

Upon motion regularly made and seconded, the nominations were closed and the secretary was instructed to cast the unanimous ballot.

Secretary Meyerding: The secretary hereby casts the unanimous ballot for Dr. C. M. Robilliard of Faribault as second vice president.

President Pearce: The next is the election of secretary. The chair will receive nominations for secretary for the ensuing year.

Dr. A. W. Adson: I move that Dr. Meyerding be re-employed as secretary of this Association.

Dr. E. S. Boleyn: I second the motion.

President Pearce: Are there any other nominations?

Dr. F. J. Lexa (Lonsdale): I move that the nominations be closed and the president cast the unanimous ballot.

The motion was regularly seconded, put to a vote and carried.

President Pearce: The president hereby casts the ballot for Dr. Meyerding as secretary for the ensuing year.

The next is the election of treasurer for the ensuing year.

Dr. D. A. MacDonald (Minneapolis): I nominate Dr. Condit.

The nomination was regularly seconded.

Dr. O. J. Hagen (Moorhead): I move the nominations be closed and the secretary cast the unanimous ballot of this House of Delegates for Dr. Condit for the ensuing year.

The motion was regularly seconded, was put to a vote and carried.

Secretary Meyerding: The secretary hereby casts the unanimous ballot for Dr. W. H. Condit of Minneapolis as treasurer.

President Pearce: Because Dr. Frank Savage is president for 1934, his office as councilor becomes vacant. We will now receive nominations for councilor to fill out the balance of his term.

Dr. E. S. Boleyn: I wish to nominate Dr. George Earl to take the place of Dr. Savage as councilor of the Fifth District.

The motion was regularly seconded.

President Pearce: Are there other nominations?

Dr. G. N. Ruhberg (St. Paul): I nominate Dr. Albert Schulze.

President Pearce: Is there a second to Dr. Schulze's nomination?

Dr. J. M. Culligan (St. Paul): I second the nomination of Dr. Schulze.

President Pearce: I will appoint Dr. Fansler and Dr. Coventry as tellers.

The next is the election of councilor for the Fourth District, for a term of three years. The present incumbent is J. S. Holbrook. The chair will receive nominations for councilor for the Fourth District.

Dr. A. G. Liedloff (Mankato): I would like to nominate J. S. Holbrook to succeed himself as councilor for the Fourth District.

Dr. L. L. Sogge (Windom): I second the nomination. I move that the secretary be instructed to cast the ballot for J. S. Holbrook to succeed himself.

Dr. Liedloff: I second the motion.

The motion was put to a vote and carried.

Secretary Meyerding: The secretary hereby casts the unanimous ballot for Dr. J. S. Holbrook of Mankato to succeed himself as councilor for the Fourth District.

President Pearce: The next is the election of councilor from the Sixth District. J. M. Hayes is the present incumbent.

Dr. D. A. MacDonald (Minneapolis): It was my privilege to nominate Dr. Hayes last year to fill the unexpired term of Dr. Pearce. I think Dr. Hayes has shown ability on this Council, and I want to nominate him again for this office.

The motion was regularly seconded.

Upon motion regularly made and seconded, the nominations were closed and the secretary was instructed to cast the unanimous ballot.

Secretary Meyerding: The secretary hereby casts the unanimous ballot for J. M. Hayes as councilor of the Sixth District.

President Pearce: The next is the election of councilor for the ensuing three years, from the Eighth District. Dr. O. J. Hagen is the present incumbent.

Dr. O. J. Hagen (Moorhead): Three nights ago I drove down to the city of Rochester, à la Huey Long. I carried a loudspeaker and opened headquarters in the Kahler Hotel. I wanted to be renominated for Councilor of my particular district. I thought I had served them with unstinted distinction, but no one came into the headquarters. Nobody listened when I spoke through the loudspeaker. I began to talk over the matter with myself and asked myself whether I was going to run again or not, under such circumstances. I received quite a bit of encouragement from myself.

I sat on my own knee and talked the matter over, as a man should, in running for office. I heard the honorable president the other night, put up his ideas of his program for the next year. When I heard they were going to meet six times a year and meet day and night, I thought the task was too big for me to carry on. So I resolved that, receiving no encouragement for the office, and unable to meet such a tremendous program as is sketched out for the coming three years under the dominancy of this president that holds over until January 1, I was not quite equal to the task. It isn't because I do not love this Council. There is no finer body standing for high ideals of medicine in America than the Minnesota Council. I have loved to work with them, and with the progress they have shown, every physician in Minnesota has reaped the benefit.

I bethought myself and said, "Now, I have to place in nomination somebody who knows the ropes." I think no man should serve on the Council for only three years, because it really takes three years to understand some of the business that the Council has to deal with in changing times.

I said, "I must get someone who is a high-powered

man and who knows the ropes," as Huey Long says. I ran down the list and I found there were two or three very capable men in my district who could take care of the matter, be acceptable to the Council and be in line with the policies of the administration at the present time.

I am presenting for your consideration, Fellow Delegates and Councilors, the name of the man who probably gave the greatest impetus to what is termed a new deal for the doctors of Minnesota through its Medical Association. I have reference to its past president, the Cincinnatus of the West, Dr. Willard Burnap, to serve you for the next three years.

Dr. L. H. Rutledge (Detroit Lakes): I come from the same district as Dr. Hagen and Dr. Burnap. Dr. Hagen, in his mild way, failed to tell you that he is also a regent of the University and that consumes a great deal of time. We live in the northwestern part of Minnesota where it is a little hard to make a living. It is necessary for us to put in many hours. The tendency now is not to work everybody as hard as they have been doing. There have been several improvements along the scientific line. The tendency, both in government and in science, is to cut down the hours. A man in Saint Paul has invented a slide rule whereby we may be able to gage our actions better.

Dr. Hagen has served this organization well. Were it not for the fact that he is begging to be relieved of his many duties, I would not be in favor, nor would our county society be in favor of it because we think a great deal of him. He has done much for our society.

However, I want to take this opportunity to wish it onto another willing horse, and to second the nomination of Dr. Burnap.

President Pearce: Are there any further nominations for councilor of the Eighth District?

Upon motion regularly made and seconded the nominations were closed and the secretary was instructed to cast the ballot.

Secretary Meyerding: The secretary hereby casts the unanimous ballot for Dr. W. L. Burnap of Fergus Falls as councilor of the Eighth District for the ensuing three years.

President Pearce: Are the tellers ready to report on the election of councilor for the Fifth District?

Dr. Fansler: Mr. President, the tellers have counted the votes, and they find there are forty-two votes for Dr. George Earl and ten for Dr. Schulze.

President Pearce: You have heard the result of the tellers. We will declare Dr. George Earl elected as councilor for the Fifth District to fill out the unexpired term of Dr. Frank Savage.

Dr. E. C. Boleyn: I move that the election be made unanimous.

The motion was regularly seconded.

President Pearce: It has been moved and seconded that the election of Dr. George Earl as councilor for the Fifth District be made unanimous. All in favor of that motion will signify by saying "aye"; opposed. It is declared unanimous.

The next order of business is the election of delegate and alternate to the American Medical Association. According to the By-Laws of this organization, the Council is empowered or instructed or authorized to present a nominee to the House of Delegates for each of these offices.

The Council met and deliberated on the subject and have nominated for this office Dr. C. B. Wright, the present incumbent, as delegate, and Dr. J. T. Christison of St. Paul, as alternate.

The chair will accept other nominations from the floor for the office of delegate and alternate to the American Medical Association.

Dr. H. M. Workman: There being no further nominations, I move the nominations be closed and the recommendation of the Council be adopted and the secretary cast the ballot

Dr. W. H. Coventry: I support the motion.

President Pearce: You have heard the motion of Dr. Workman, that there being no further nominations, the nominations be closed and the secretary be instructed to cast the unanimous ballot of the House of Delegates for Dr. C. B. Wright as delegate to the American Medical Association and Dr. J. T. Christison as alternate. All in favor say "aye"; opposed. It is carried. The secretary will cast the ballot.

Secretary Meyerding: I hereby cast the unanimous ballot for Dr. C. B. Wright of Minneapolis as delegate and Dr. J. T. Christison of St. Paul as alternate.

President Pearce: We will take up next unfinished business. I am going to call on Dr. Christison.

Dr. J. T. Christison: There is a report of the Necrology Committee that was handed to me last evening by Dr. Hamilton.

Dr. Christison read the report of the Necrology Committee.

NECROLOGIC REPORT OF THE HISTORICAL COMMITTEE

Again within the year death has called several of our members. Many of them have already been referred to in Minnesota Medicine and in the *Journal Lancet*. Your committee desires to express its appreciation of former friends whom we loved and admired and our sympathy with the friends and relatives who remain.

The necrologic report covers the period from May 20, 1932, to May 20, 1933.

Members

James Walter Andrist, formerly of Owatonna, Minn. Died, May 21, 1932, in San Diego, Calif. Aged 57. Rush Medical College, 1900.

Amos L. Baker, Kasson. Born, 1852. Rush Medical College, 1887. Died, July 20, 1932. Aged 80.

John W. Bell, Minneapolis. Born, 1853. Ohio Medical College, 1876. Died, May 16, 1933. Aged 80.

John Archibald Cameron, Saint Paul. Born, 1869. University of Minnesota, 1902. Died, April 4, 1933. Aged 64.

Sheridan Grant Cobb, Saint Paul. Born, 1862. Hahnemann Medical College, 1884. Died, November 18, 1932. Aged 71.

W. F. Cobb, Lyle. Born, 1847. Chicago Medical College, 1874. Died, June 14, 1847. Aged 85.

John E. Dewar, Minneapolis. Born, 1871. McGill University, 1896. Died, March 15, 1933. Aged 62.

Godfrey Deziel, Minneapolis. Born, 1861. Saint Paul Medical College, 1886. Died, March 27, 1933. Aged 71.

Franklin A. Dodge, Le Sueur. Born, 1862. University of New York, 1886. Died, December 6, 1932. Aged 70.

Norman Dreisbach, Minneapolis. Born, 1867. College of Phys. & Surg., St. Louis, Mo., 1894. Died, April 29, 1933. Aged 65.

John Llewellyn Eliot, Minneapolis. Born, 1853. Georgetown University School of Medicine, 1874. Died, November 14, 1932. Aged 80.

John Leonard Everlof, Minneapolis. Born, 1888. Jefferson Medical College, 1916. Died, July 12, 1932. Aged 44.

John M. Fox, Minneapolis. Born, 1875. Minneapolis College of Phys. & Surg., 1901. Died, July, 1932. Aged 57.

Emil S. Geist, Minneapolis. Born, 1878. University of Minnesota, 1900. Died, May 14, 1933. Aged 55.

Sidney S. Hall, Minneapolis. Born, 1884. Harvard University Medical School, 1867. Died, May 7, 1932. Aged 88.

Adolph Hirschfield, Minneapolis. Born, 1864. University of Minnesota, 1893. Died, January 3, 1933. Aged 69.

James Hynes, Minneapolis. Born, 1867. Minneapolis College of Physicians and Surgeons, 1899. Died, June 7, 1932. Aged 65.

Theodore N. Kittleson, Fergus Falls. Born, 1875. University of Minnesota, 1902. Died, January 10, 1933. Aged 57.

Daniel Kriedt, Minneapolis. Born, 1877. University of Minnesota, 1900. Died, Decemher 29, 1932. Aged 50.

Thomas G. Lee, formerly of Minneapolis, died Sept. 1, 1932, at Babson Park, Florida. Born, 1860. University of Pennsylvania, 1886. Aged 72.

William H. Magie, Duluth. Born, 1854. St. Louis Medical College, 1884. Died, December 11, 1932. Aged 78.

Irwin A. O'Connor, Saint Paul. Born, 1898. University of Minnesota, 1922. Died, December 26, 1932. Aged 34.

Wyman Smith, Minneapolis. Born, 1903. Northwestern University, 1931. Died, April 20, 1933. Aged 30.

George Christian Wellner, Minneapolis. Born, 1849. Rush Medical College, 1873. Died, March 3, 1933. Aged 84.

Former Members

Leroy A. Brown, St. Paul. Born, 1855. University of Michigan, 1885. Died, November 22, 1932. Aged 77.

Catherine A. Burnes, Hopkins. Born, 1849. University of Minnesota, 1885. Died December 10, 1932. Aged 83.

C. A. Hegge, formerly of Austin, Minn., died at La Fiera, Texas, December 14, 1932. Aged 66. University of Illinois, 1893.

Eugene Hubbell, Saint Paul. Born, 1855. Hahnemann Medical College, 1883. Died April 20, 1932. Aged 77.
Clarissa Clay Richardson, St. Paul. Creighton University, 1917. Died, April 16, 1933.
Herman Russell, Saint Paul. Born, 1871. University of Illinois, 1899. Died, June 29, 1932. Aged 60.

PRESIDENT PEARCE: I think it is only fitting that we should stand with bowed heads for a moment out of respect to those who have passed on.

The audience arose and stood in silent tribute to the departed members.

PRESIDENT PEARCE: The chair will ask Dr. Bert Adams and Dr. J. T. Christison to act as a presentation committee for the new president, Dr. Savage, and also Dr. George Earl. This same committee will officiate in presenting to this organization, Dr. Savage and Dr. Earl, and they will also officiate tomorrow morning in presenting them to the general meeting.

While we are waiting for them to find the newly elected president, we will proceed with the next order of business, which is to decide the time and place of the next annual meeting.

DR. F. H. MAGNEY (Duluth): This society has gone into the history of our organization, especially ancient history, the very interesting work being done by Dr. Hamilton. This history usually brings up the hardships of the early days as one of the outstanding features.

I would like to call your atention to some more recent history that has more of a pleasant feature. We recall we had a medical meeting in Duluth three years ago. We recall that a week or two previous to this meeting there was a wave of extreme heat over the state of Minnesota.

You will recall that most of your patients went to the lakes and the country district to get away from this heat. You will rccall that during this period your minds and thoughts were placed on Duluth. You will recall that within three days of the meeting, you got into your cars and went to Duluth to get away from the extreme heat. You will recall that the trip was very warm until you reached the close proximity of Duluth, when the ventilation in the car was diminished, and you drew your panting tongue into your oral cavity where it properly belonged.

You will recall you were pleased to see the cool waters of Lake Superior. You will recall that your car was carefully put away. You will recall that you took a nice bath in the pure waters of Lake Superior and cooled off. You will recall you had the first pleasant night's sleep in a period of two weeks, that you slept under blankets, in other words.

You will recall that we had a very successful meeting, everything conducted on one floor. I might add that to take care of a large program of the State Association we have additional space on that same floor, space recently vacated by the Chamber of Commerce.

You will recall that after this meeting you made further sojourns into the back woods of Duluth, that you fished in the clear cool waters of that country, and that you made this your summcr vacation.

We as delegates from Duluth invite you to re-enact that history this next year.

PRESIDENT PEARCE: Dr. Meyerding has a number of other letters which he would like to read.

SECRETARY MEYERDING: There are two letters, one from the Saint Paul Convention Bureau, and another from Minneapolis. There are no invitations from other medical societies. I don't know whether you want to consider the convention bureaus or take the invitations only from the medical society.

PRESIDENT PEARCE: I think it should come from the medical society. Are there any other invitations from medical societies for the 1934 meeting? If there are not, a motion that the ncxt meeting be held in Duluth, time to be left to the discretion of the Council, will be in order.

DR. WORKMAN: I move that the next meeting be held in Duluth.

The motion was regularly seconded.

PRESIDENT PEARCE: It has been moved and seconded that the next meeting of the Association be held in Duluth. All in favor will signify by saying "aye"; opposed. The motion is carried.

Is there any new business to come before the House of Delegates?

I think it would be fitting and proper for the House of Delegates to go on record with a resolution of thanks to the Olmsted-Houston-Fillmore County Society, the Kahler Hotel and Arthur Hotel, St. Mary's Hospital, Rochester Association and the Rochester papers.

Dr. Meyerding suggests that if this motion is made it include the provision that Dr. Hagen draw up such a resolution. Do I hear a motion?

DR. J. S. REYNOLDS (Minneapolis): I movc that the secretary write such a letter to the list you mentioned.

The motion was regularly seconded.

PRESIDENT PEARCE: You have heard the motion. All in favor of Dr. Hagen drawing up such a resolution, to be presented to the secretary, will signify by saying "aye"; opposed "no." It is carried.

Under the head of new business, there are two amendments to the By-Laws presented at the last meeting of the House of Delegatcs to be voted on today.

Secretary Meyerding read the amendment to Chapter V, Section 2 of the By-Laws.

PRESIDENT PEARCE: You have heard the amendment which was presented at the last House of Delegates. A motion for the acceptance of this amendment to the By-Laws will be in order.

A motion was regularly made and seconded for the acceptance of the amendment.

DR. CHRISTISON: Dr. Adams and I have the honor to introduce to you Dr. Frank Savage of Saint Paul, your new president.

The audience arose and applauded.

PRESIDENT-ELECT SAVAGE: Gentlemen, I can only say that I appreciate very decply this honor which has come to me, which is, without any question, the greatest honor that I have ever received. I thank my friends throughout the state for this. I take it that this is a mandate on your part for the carrying out of the policies of the State Association, these precedents and these ideas which have been promulgated, worked on, in the past years. I pledge myself to continue those policies to the best of my ability.

PRESIDENT PEARCE: We will now go back to the acceptance of the amendment to Chapter V, Section 2, of the By-Laws. There was a motion made for its acceptance. Those in favor say "aye"; opposed "no." It is carried.

We have another By-Law that was presented at the meeting on Sunday night.

Secretary Meyerding read the amendment to Chapter IX, Section 1, of the By-Laws.

PRESIDENT PEARCE: A motion to accept this By-Law will be in order.

DR. E. KLAVENESS (St. Paul): I move that it be accepted.

The motion was regularly seconded.

PRESIDENT PEARCE: You have heard the motion to accept this amendment. Those in favor signify by saying "aye"; opposed "no." It is carried.

DR. HAYES: There is still another amendment to the By-Laws with reference to changing the name of the Committee to Study Insurance and Compensation Practice, to Committee on Industrial Relations.

PRESIDENT PEARCE: The committees that have to do with economics have to be changed from time to time. The function of the committee may have to be changed. They may have to be discontinued and new committees appointed. It seems to me it is better policy not to have these committecs set up permanently in the By-Laws, because it takes some time at an annual meeting until they can be changed. As long as the Council is your business executive organization and has the responsibility for it, I think they should have control of

these committees that are doing the work. I will be very glad to straighten it out as you wish, but it seems to me, from the standpoint of work, you would be better off leaving it as it is.

DR. C. B. WRIGHT: I would be in favor of leaving the thing the way it is, in the Council's hands.

DR. HAYES: The same thing was introduced two years ago and was lost.

PRESIDENT PEARCE: Have you anything further to say for the Reference Committee?

DR. MAGNEY: No.

DR. HAYES: That will be satisfactory if it is made a permanent committee.

PRESIDENT PEARCE: Is there any further business to come before the House of Delegates?

DR. W. F. BRAASCH: In view of the fact that Dr. Arthur D. Hirschfelder of the University is dangerously ill, I think it would be a fine thing if the secretary would express our sympathy to him and Mrs. Hirschfelder and hope he will have an early recovery. I so move.

SECRETARY MEYERDING: Letter or telegram?

DR. W. H. COVENTRY: A telegram.

The motion was regularly seconded, put to a vote and carried.

PRESIDENT PEARCE: Dr. Earl, possibly you are not aware that you have just been elected councilor of the Fifth District to take the place of our president-elect.

DR. GEORGE EARL: I met Ed Booth downstairs and he told me you wanted me up here.

There is just one thing I want to say, and that is I hope in Saint Paul, Ramsey County, and in the other counties in this councilor district, everyone will feel that I am going to be councilor for the entire group. I know I can depend upon the other men there to solve the problems of the councilor district for the benefit of us all.

PRESIDENT PEARCE: Is there anything further to come before the meeting?

DR. L. L. SOGGE (Windom): As a member of the Council I know slightly about the work and thought that one of our retiring councilmen has given. I feel, for one, that the Minnesota State Medical Association owes Dr. Hagen a vote of thanks.

As a member of the Council, I can assure you we will miss him, miss his advice, his genial spirit and his wonderful sociability. Though I know we have given a good man back, I don't believe there is anybody in the Association can replace Dr. Hagen.

I make a motion that we give Dr. Hagen a vote of thanks for all he has done for the State Association as a member of the Council.

The motion was regularly seconded by several.

PRESIDENT PEARCE: You have heard the motion. Does anyone wish to add anything?

DR. R. D. MUSSEY (Rochester): I move that Dr. Hagen be invited as a guest at the annual meetings of the House of Delegates.

PRESIDENT PEARCE: We can have that as an amendment to the motion.

DR. SOGGE: I accept the amendment.

PRESIDENT PEARCE: You have heard the motion to give a vote of thanks to Dr. Hagen and also inviting him to be a guest of the House of Delegates. All in favor signify by saying "aye"; opposed "no." It is carried.

Is there any further business to come before the House of Delegates?

DR. JULIUS JOHNSON (Minneapolis): We have heard of the untiring work of Herman Johnson in the legislature, in behalf of the practice of medicine. Would it be appropriate to give him a vote of thanks for his work? I so move.

The motion was regularly seconded.

PRESIDENT PEARCE: You have heard the motion. Is there any further comment? Those in favor of giving Dr. Herman Johnson a vote of thanks for his untiring efforts in behalf of medicine will signify by saying "aye"; opposed. The motion is carried.

The meeting adjourned at one-fifty o'clock.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

MEDICAL RELATIONS UNDER WORKMEN'S COMPENSATION. Report issued by the Bureau of Medical Economics of the American Medical Association. 157 pages. Price, paper, 75 cents. Chicago: American Medical Association, 1933.

PUBLIC HEALTH NURSING IN INDUSTRY. Violet H. Hodgson, R.N., Assistant Director National Organization for Public Health Nursing. 349 pages. Illus. Price, $1.75, cloth. New York: MacMillan Company, 1933.

REPORT TO THE UNITED STATES GOVERNMENT ON TUBERCULOSIS WITH SOME THERAPEUTIC AND PROPHYLACTIC SUGGESTIONS. S. Adolphus Knopf, M.D. 59 pages. Illus. Price, $1.15, cloth. New York: National Tuberculosis Association, 1933.

TEXTBOOK OF PHYSICAL THERAPY. Heinrich F. Wolf, M.D., Chief of Department of Physical Therapy, Mt. Sinai Hospital and Dispensary, New York, etc. Foreword by Lewellys F. Barker, M.D., LL.D., Professor Emeritus of Medicine, Johns Hopkins University School of Medicine, and chapters by others. 409 pages. Illus. Price, $5.50, cloth. New York: D. Appleton-Century Company, 1933.

FRONTIERS OF MEDICINE. Morris Fishbein, M.D. 207 pages. Price, $1.00. Baltimore: Williams & Wilkins Co., 1933.

This is a well written, short, elementary history of the progress of medicine during the ages. The style is characteristic of Dr. Fishbein and the book contains many passages especially curt and to the point. In speaking of a victim of smallpox, "he walks about as a monument to his own stupidity or to his parents' ignorance." One wonders what the author really means when he writes—"Several surgeons have now removed one-half of the cerebrum of patients and there is evidence that one female patient continued to think as well as any woman." The volume is obviously intended for the intelligent layman rather than for the medical man. For that purpose it is a good book, in the reviewer's opinion.

D. M. SIPERSTEIN, M.D.

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UNDULANT FEVER (BRUCELLIASIS)*

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DURING the past five years, undulant fever has evolved from the obscurity of a clinical curiosity to the prominence of an important public health problem. The occasional sporadic cases which were encountered prior to 1926 were for the most part related to endemic foci of goat infection in Texas, New Mexico and Arizona. Up to that time it appeared to be an established fact that undulant (Malta) fever had its sole source in goats and was transmitted to human beings through the ingestion of their raw products.

The first recognition of the disease along the Mediterranean Coast produced such synonymous designations as Malta fever, Mediterranean fever, Gibraltar fever, rock fever, Neapolitan fever and Cyprus fever. In 1886, David Bruce[7] isolated the organism responsible for the infection; he named the organism *Micrococcus melitensis.* Some eleven years after Bruce's discovery, Bang[3] of Copenhagen, isolated the causative organism of contagious abortion of cattle, which he called *Bacillus abortus.* A British Commission, headed by Bruce, investigated the disease on the island of Malta during the years 1904 to 1907. They demonstrated that the ingestion of raw goat's milk was the common source of infection for man. The prohibition of the use of raw goat's milk by the men of the military and naval forces produced an immediate and rapid decline in the incidence of the disease.

For twenty-one years the *Micrococcus melitensis* of Bruce and the *Bacillus abortus* of Bang were regarded as separate, unrelated species, until Alice Evans,[12] in 1918, discovered that the two organisms were indistinguishable morphologically, biochemically, culturally and by ordinary agglutination tests. The results of further studies led Evans to state that the two organisms probably possessed similar pathogenicity for human subjects. In 1927, Carpenter[8] recovered an organism indistinguishable from *Brucella abortus* from the blood of ten human beings with undulant fever; five pregnant heifers inoculated with these cultures promptly aborted. These observations of Evans and Carpenter have been confirmed by many workers throughout the world. It is now known that the organism which produces contagious abortion in cattle and other domestic animals is capable of producing in human beings a disease clinically and bacteriologically similar to the Mediterranean type of Malta fever.

American physicians soon realized that these observations provided an explanation for their failure to arrive at a confirmed diagnosis in many cases of typhoid-like and malaria-like diseases. Reports of the discovery of the disease in many widely separated states soon appeared. In 1926, forty-six cases were reported, chiefly from New York, Michigan, Illinois and Ohio. During the years 1927 to 1930, inclusive, the recorded cases numbered 217, 649, 1301 and 1385, respectively. During 1929, cases of undulant fever were recorded by state health departments in every state of the Union. During the past two years over 3000 cases of undulant fever have been officially reported to state health departments. Undulant fever is now a reportable disease in forty states.

During the past five years the writer has investigated 142 cases of undulant fever in Dayton and the surrounding communities. This undertaking was the result of a determined effort to learn of the incidence of the disease in a circum-

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scribed locality. Stimulated by a similar motive, Hardy[21] has investigated over 800 cases in Iowa, during the past four years. Carpenter[10] in New York, Huddleson [22] in Michigan, Bierring[4] in Iowa, King[24] in New York, Farbar and Mathews[16] In Indiana, Brown[6] in Kansas, Sensenich and Giordano[29] in Indiana, and Ey[14] in Ohio, have conducted similar investigations in their localities; their efforts have likewise been rewarded by the discovery of a large number of cases. The inference is obvious that the disease must be much more prevalent than is generally believed.

The findings of Evans made it apparent that the *abortus-melitensis* group of organisms should be reclassified. Meyer and Shaw[26] proposed that the organisms of this group should be designated by the generic name *Brucella;* this suggestion has met with universal approval. It is believed by some that there are three varieties of *Brucella.* The organism usually associated with infection in goats has been designated as *Brucella melitensis* variety *melitensis;* the organism of contagious abortion of cattle is referred to as *Brucella melitensis* variety *abortus;* the organism ordinarily found in swine infections has been called *Brucella melitensis* variety *suis.* The *Brucella* exhibit marked pleomorphism; coccoid and bacillary forms, as well as intermediary oval forms, are commonly observed. Attempts to divide the organisms of the genus *Brucella* into distinct caprine, bovine and porcine species (by cultural characteristics, serologic reactions, pathologic changes, hydrogen sulphide metabolism, bacteriostatic action of dyes, utilization of dextrose and agglutinin absorption tests) have not been uniformly successful. Organisms which have been designated as porcine or caprine species have been recovered from cow's milk. In the light of present knowledge it seems desirable to refer to all of the varieties as the *Brucella.* Furthermore, the confusion resulting from the many names which have been used to designate the disease caused by *Brucella* in animals and man would be overcome by the adoption of the single designation *Brucelliasis.*

Among urban populations the disease appears to be chiefly transmitted through the raw milk of cattle infected with the *abortus* variety of the organism. Of the 142 cases of undulant fever studied by the writer, the ingestion of raw milk containing the organism of contagious abortion of cattle was demonstrated to be the source of infection in the great majority of instances; these findings are corroborated by the investigations of Carpenter, King, Orr, Huddleson, Farbar, Mathews, Sensenich, Giordano, Ey and others. Hardy expresses the belief that direct contact with infected cattle and hogs has been responsible for a great number of cases of undulant fever occurring in that State. Hardy's investigations lead him to the conclusion that the *abortus* and *suis* varieties of the organism are about equally responsible for the undulant fever morbidity in that State. Hardy[20] has demonstrated by animal experiments that the skin may act as the portal of entry of the organism. Morales-Otero,[27] of Puerto Rico, has reproduced the disease in human volunteers by inoculations with bovine and porcine strains of *Brucella abortus* through abraded skin. It is apparent, therefore, that there are two important sources of infection for man, namely, the ingestion of raw milk or unpasteurized dairy products containing *Brucella,* or direct contact with infected fresh animal tissues.

CLINICAL MANIFESTATIONS IN MAN

Because undulant fever presents many symptoms and signs common to typhoid fever, malaria, tuberculosis and influenza, it is frequently confused with these diseases. Many physicians have arrived at a tardy diagnosis of undulant fever only after repeated negative Widal reactions, the failure to demonstrate the malarial plasmodium, and the inability to elicit physical signs or roentgenographic evidence of tuberculosis. Less often, the disease has been confused with acute rheumatic fever, subacute bacterial endocarditis, bronchitis, pyelitis, appendicitis, cholecystitis, or tularemia.

As a result of the more extensive studies which have been made during the past few years, it has become increasingly apparent that a majority of the cases of undulant fever present a more or less characteristic clinical picture. The disease appears to occur predominantly among males, particularly in rural districts. Young and middle-aged adults are most often affected. Children appear to possess some degree of immunity to the disease; ten per cent of the patients in the Dayton series of cases were children in the first decade of life. The relative immunity of children appears to parallel that of calves.

The incubation period has been found to vary from five days to three weeks; the average incubation period is two weeks. The prodome is not unlike that of any general infection, although in occasional cases the disease is initiated with a chill and a rapid elevation of temperature to 103-105° F. Ordinarily, the patient becomes gradually aware of an afternoon or evening rise of temperature, associated with chills, nocturnal perspiration and marked weakness. The fever, chills and sweats usually pursue a characteristic course. The patient usually feels quite well in the morning, particularly in the early stages of the infection. As the daily elevation of temperature develops, usually during the afternoon or evening, the symptoms return. The nocturnal exacerbations of fever occasionally reach great heights (106-107° F.). The average maximum fever is 103° F. There is often a remarkable disparity between the subjective sense of feverishness and the extent of fever as registered by the clinical thermometer; in many instances the patient does not complain of fever nor does he present a febrile appearance, but the physician finds, to his great surprise, a fever of 102 to 103° F. As the fever abates, chills and sweating occur. If defervescence is rapid, the perspiration is more likely to be of a drenching character. The chills are sufficiently severe to be regarded as true rigors in about one-third of cases. There has been no history of chills in about ten per cent of patients who have experienced fever and sweats.

Marked restlessness and insomnia usually accompany the nocturnal febrile exacerbations. Delirium occurs in some cases in which the fever reaches great heights. Ordinarily, the mental state remains clear during the febrile course of the disease; the so-called "typhoidal state" is rarely, if ever, observed.

The matutinal remissions and the nocturnal exacerbations of fever may last from one week to several months. The name "undulant fever" refers particularly to recurring relapses of fever. Such febrile relapses appear to be the exception rather than the rule in the recently described American cases; most patients have experienced but one febrile period, lasting from one week to several months, and finally reaching the normal level by lysis.

The essential gastro-intestinal complaints are anorexia and constipation. The degree of constipation appears to parallel the severity of the infection. Diarrhea is of rare occurrence. Loss of weight is an almost constant feature of the disease. Patients experiencing a severe infection will often lose from twenty-five to fifty pounds in weight.

With the exception of such signs as fever, weakness and loss of weight, there is often a remarkable absence of positive physical findings. The spleen is palpable in about one-third of the cases. Tenderness or pain in the joints, or muscles, or both, is likewise observed in about one-third of the cases. The presence of transient migrating polyarthritis, particularly of the larger joints, has led to confusion with acute rheumatic fever. No permanent impairment of the joints has been observed.

Probably the most important surgical consideration in undulant fever lies in the frequent occurrence of abdominal pain during the acute manifestations of the disease. Abdominal pain was a prominent feature of the disease in sixteen of the Dayton cases. Among 125 cases studied by Hardy, abdominal pain was present in forty; in ten of these it was the major complaint, and it was a marked feature of the disease in twenty-four others. In the cases studied by me the pain was localized in the epigastrium in six instances, in the right upper quadrant in four, and in the right lower quadrant in six. In four instances of sudden right lower quadrant pain with fever, appendectomy was performed. In one instance a gangrenous appendix was found; this patient had been ill with an intermittent fever for three weeks prior to the development of acute pain in the lower right abdominal quadrant, associated with muscle rigidity over McBurney's point. A leukocyte count made at this time showed 6,000 leukocytes, 62 per cent of which were polymorphonuclears, the other white cells being equally divided between small and large lymphocytes. The development of acute appendicitis as a complication of undulant fever is practically unknown. This exceptional case was made the subject of a report by L. G. Bowers and the writer.[32] In the other three cases in which appendectomy was performed normal appendices were removed. In these three cases the surgeons requested the agglutination test for undulant fever after operation in an effort to find the real cause of the abdominal pain and persistent fever. After the agglutination test was reported positive

a typical undulant fever history was elicited in all three of the cases. In two of the Dayton cases cholecystectomy was seriously contemplated because of the existence of upper right quadrant pain, associated with fever, chills and sweats. Leo Ey[15] has recently stated in a report of thirty-five cases of undulant fever that one of the patients was operated upon for appendicitis, one for cholecystitis, while another was being prepared for similar operation when the real cause of his illness was discovered by the agglutination test. The writer has learned of twenty-one other instances in which appendectomy has been performed and eight in which cholecystectomy has been performed upon patients suffering from undulant fever. The pathologic studies of the appendices and gallbladders in these cases revealed no evidence of any active inflammatory process. These findings lead to the conclusion that many patients with undulant fever will present some clinical symptoms and signs which might easily be attributed to appendicitis or cholecystitis. It becomes a matter of some importance, therefore, that the surgeon should be aware of the characteristics of this disease in order to avoid unnecessary surgical interventions.

Brucella abortus exhibits a predilection for the genital tract of cattle. There is convincing evidence that the same selectivity occurs in some human beings. Painful swelling of the testes was a prominent feature of the disease in twelve of our cases and in forty of Hardy's cases. The elimination of the organism in the urine has been a common finding. In the bull, the infection frequently gives rise to seminal vesiculitis and orchitis. In guinea pigs which are inoculated with *Brucella abortus,* orchitis is a common result. Three of our male patients were first examined by genito-urinary surgeons who found clinical evidence of seminal vesiculitis, prostatitis, epididymitis and orchitis. All three denied exposure to gonococcal infection and repeated smears made from uretheral discharges after prostatic massage revealed no gram-negative diplococci. The sera of the three men was found to agglutinate *Brucella abortus* in dilutions from 1:160 to 1:640. Furthermore, the organism was recovered in one case from a draining sinus tract which extended from the globus major of the epididymis through the scrotal wall. Two of these patients were constant consumers of raw milk; the third drank raw milk occasionally and used unpasteurized country butter at his home.

The causative organism derives its name (*Brucella abortus* or organism of contagious abortion) from its etiologic association with abortion in cattle and other domestic animals. It seems reasonable to suppose that the organism might have a similar effect on pregnant women. The literature contains a number of reports of human abortions occurring on farms where the cattle were affected with contagious abortion. We have encountered five cases in which women who have repeatedly aborted and who presented no clinical or serologic evidence of syphilis, gave serologic evidence of previous infection with *Brucella abortus.* In these cases the agglutination titers ranged from 1:80 to 1:320. Four of the five women gave histories of a previous febrile illness, the nature of which had not been determined, at intervals from three to six years previously. All had been raw milk consumers. *Brucella abortus* has been isolated from a tuboovarian abscess which developed as a late complication in a case of known undulant fever. Kristensen[25] isolated the *abortus* variety of the organism from the exudate which covered the uterine site of the placenta of a seven-month fetus. Carpenter[9] has recovered the organism from the tissues of a human fetus which was aborted at the end of the fourth month of gestation. Frei[18] has isolated *Brucella* organisms from the vaginal discharge of a woman who had aborted ten days previously. Other investigators, notably Harbinson,[19] and Ey, have found strongly circumstantial serologic evidence that *Brucella* infection was a factor in the production of several cases of human abortion. These findings open a new field of investigation in cases of human abortion.

A skin eruption, usually macular or maculopapular, is a relatively infrequent finding; the skin lesions may simulate the roseola of typhoid fever.

Hematologic studies usually yield important information. Some degree of secondary anemia, usually proportionate to the severity of the illness, is almost invariably present. The great majority of cases exhibit leukopenia, with the white blood cell count ranging from 4,000 to 6,000. A relative, and in some cases an absolute, lymphocytosis usually accompanies the leukopenia. Occasional patients with the mild form

of the disease show very little deviation from the normal as regards the blood picture.

The urinalysis usually reveals the trace of albumin commonly found in febrile diseases. The cerebrospinal fluid may show slight lymphocytosis and an increased sugar content, but in most cases shows no abnormalities.

CLINICAL TYPES

Four types of the disease are generally recognized: (1) intermittent, (2) ambulatory, (3) undulatory, and (4) malignant.

(1) *Intermittent type.* The majority of cases which have been observed in the United States fall into this group. The disease pursues a subacute course, with fever of an intermittent character; the morning temperatures vary from normal or slightly subnormal to 100° F., while the evening temperatures usually range from 101 to 104° F. The average duration of this type of the illness is from three to four months.

(2) *Ambulatory type.* Approximately one-fourth of the cases are characterized by a relatively short and mild illness. Many persons in this group will remain at their work although aware of the existence of mild fever and a marked sense of weakness. The symptoms and signs of this form of the disease are essentially the same as in the intermittent type, except that they are much less severe. Such cases are frequently confused with influenza.

(3) *Undulatory type.* This form of the disease is characterized by the occurrence of relapses. This feature of the disease was said to be of frequent occurrence in the Mediterranean cases, but has been present in only about 15 per cent of the cases which have occurred in this country. The successive relapses usually decrease in intensity and duration. Such cases usually pursue a more chronic course than the other forms of the disease. Physical and mental deterioration are more commonly observed in the undulatory form of the disease than in the other forms.

(4) *Malignant type.* This form of the disease is rare, having occurred in only about 2 per cent of the cases reported in this country. A sudden onset, an acute course with extreme hyperpyrexia and a fatal termination in the majority of cases are the characteristics of this unusual form of the disease. The duration of this type of the disease is usually from one to three weeks.

DIAGNOSIS

If undulant fever is given consideration in the differential diagnosis of all cases of febrile illness, especially in those in which the diagnostic criteria for typhoid fever, tuberculosis, influenza, malaria, chronic bronchitis, pyelitis, rheumatic fever or bacterial endocarditis are not convincing, the disease will be recognized with much greater frequency. This is true in cases of vague mild febrile disease as well as in those in which the clinical manifestations of undulant fever are more clearly defined. In such cases it should become an established practice to submit 4 or 5 c.c. of the patient's blood, collected exactly as for the Wassermann test, to a laboratory equipped with the proper antigens, for the agglutination test. The rapid macroscopic agglutination method of Huddleson[23] is a simple and reliable procedure.

Anti-*abortus* serum agglutinins may appear as early as the fifth day, but in most instances they appear sometime during the second week of illness. It is, therefore, unwise to collect the blood specimen for the agglutination test until a week or ten days after the onset of illness. In occasional cases agglutinins will not appear until the third or fourth week of illness. The agglutination titer rises to variable heights during the acute course of the disease and tends to fall when the fever abates. Ordinarily, agglutination in dilution of 1:160 to 1:1280 will be found during the fourth or fifth week of illness. Many persons will retain anti-*abortus* serum agglutinins for many months or years, while in other cases they will entirely disappear a few months after recovery.

There is convincing evidence that about 5 per cent of individuals with undulant fever, from whose blood the organism may be recovered, fail to develop anti-*abortus* serum agglutinins. Furthermore, some patients who exhibit a well-defined clinical picture of undulant fever, and from whose blood *Brucella abortus* has been recovered, will show agglutination in titers below 1:80. It cannot be said, therefore, that there is any arbitrary diagnostic agglutination titer. For practical purposes, diagnostic significance is usually attributed to agglutination in dilutions of 1:80 or above. In patients in whom the clinical manifestations are strongly suggestive, the absence of agglutinins or the presence of agglutinins in titers of 1:10 to 1:40 should stimulate

further serologic and bacteriologic studies. The skin test, using an *abortus* antigen, appears to be of value in differentiating the cases in which agglutinins are absent or are present in low titer. This is done by injecting one-tenth of one c.c. of a saline suspension of heat-killed or formalin-killed abortus organisms, adjusted to a standard of two billion organisms per cubic centimeter. We utilize the same suspension for skin testing and for vaccine therapy. A positive test is characterized by the gradual development, usually within twenty-four to forty-eight hours after injection, of an indurated reddish area, usually about the size of a five cent piece. The induration usually persists for many days or weeks.

Subclinical *Brucella* infections have occurred in some persons who have been exposed to the infection; anti-*abortus* agglutinins have been demonstrated in the serums of such persons in the absence of clinical symptoms or signs of the disease. Carpenter, Boak and Chapman[11] have submitted convincing evidence that anti-*abortus* agglutinins develop only when there has been actual invasion of the tissues by living *Brucella* organisms.

The occasional cross-agglutination of the *Brucella* and *Bacterium tularense* should be borne in mind. Francis and Evans[17] have suggested that all serums from suspected cases of tularemia or undulant fever should be tested for both anti-*tularense* and anti-*abortus* agglutinins, unless the clinical history points definitely to a recognized source of infection for either undulant fever or tularemia. If it should develop that the *abortus* and *tularense* titers are the same, or nearly the same, agglutinin absorption tests will distinguish between them. The writer[30] has found *abortus-tularense* cross-agglutination in twenty-two of the 109 cases of tularemia and in twenty-eight of the 142 cases of undulant fever which he has investigated.

Since a bacteremia is present in this disease, an attempt to recover the organism by blood cultures should be made whenever possible. Blood for cultures should be collected early in the course of the disease and preferably at the crest of one of the pyrexial waves. The likelihood of recovering the organism is greater if broth mediums are inoculated directly; the carbon dioxid requirement of certain strains should be borne in mind.

Urinary specimens for culture should be collected through a sterile catheter. Amoss[1] has recently described a successful method for the recovery of *Brucella* organisms from feces. The same precautions should be exercised in disposing of the urine and feces of undulant fever patients as with those suffering from typhoid fever.

Guinea pigs may be inoculated intraperitoneally with the patient's blood or saline suspensions of macerated tissue. Six to eight weeks should elapse before autopsy. Loss of weight, the presence of enlarged joints, enlarged testes and seminal vesicles, small whitish foci of necrosis in the enlarged liver, spleen and lymphnodes should be noted. Cultures should be made from the lungs, liver, spleen, kidneys, testicles and lymphnodes.

PROGNOSIS

Fatal outcome is rare, having occurred in from 1 to 4 per cent of reported cases; during 1931, seventy-four deaths were officially recorded by the United States Public Health Service as having been due to undulant fever. The importance of the disease is not to be judged by the death rate. The prolonged course and resulting invalidism make the outlook much more serious than the death rate would indicate.

TREATMENT

The most important consideration in the control of undulant fever is prophylaxis. The widespread distribution of the infection among cattle renders it difficult to control the infection at its source. Many cows have Bang's disease and eliminate the organisms in large numbers in the milk and vaginal discharges without manifesting symptoms of the disease (abortion, mastitis, sterility and lessened milk yield). While veterinarians are striving to find more simple and effective methods to eliminate the infection among animals, there appears to be but one logical method for preventing the transmission of milk-borne infection to human beings, and that is by pasteurization. Park,[28] Boak and Carpenter,[5] and Zwick and Wedeman[32] have demonstrated that complete pasteurization (143-145° F. for thirty minutes) will destroy the *Brucella*. The need for strict supervision of the pasteurization process is apparent. For the protection of the health of those persons whose occupations bring them in direct contact with infected animal tis-

sues we must rely upon education and the institution of precautionary measures.

The rapidly accumulating knowledge of the widespread distribution of undulant fever has done much to focus the attention of public health workers, veterinarians and milk producers upon the urgent necessity of eliminating milk-borne infection among human beings. While some progress has been made in the control of the infection in certain herds by eliminating reactors, physicians and public health workers should be guided by the advice offered by Alice Evans:[13]

"For the protection of milk consumers the preventive measure is quite obviously the same as that practiced for the prevention of other infectious diseases that are spread by milk, namely, pasteurization. Those who are able to pay the price for certified milk may take raw milk with a reasonable degree of safety, *if the certification guarantees that the milk is from an abortion-free herd.* No milk other than that so certified, or pasteurized milk, can be considered safe, for the cattle disease is widespread everywhere in the United States. It is fortunate that the preventive measure of pasteurization is so easily available."

For those persons who live on farms, or in small communities in which pasteurization is not practiced, the milk should be boiled for five minutes or pasteurized by the simple vacuum-bottle method proposed by Arnold.[2]

The treatment of the disease in human beings has been essentially directed toward alleviation of the prominent symptoms. Mercurochrome, acriflavine, neoarsphenamin, quinine, and nonspecific protein therapy have been advocated by several physicians. For the most part these therapeutic observations have not been subjected to adequate control and the very length of the list argues against the specificity of any of these measures.

Many observers have reported favorable results with specific vaccine therapy. The writer has prepared and utilized a *Brucella abortus* vaccine, standardized to two billion heat-killed or formalin-killed organisms per cubic centimeter, in the treatment of seventy-two of the local cases, and has distributed the vaccine to some 400 physicians in various parts of the country, with results which appear to justify its use. Comparison with a series of untreated control cases appears to indicate that the vaccine usually terminates or shortens the course of the disease and prevents recurrence. Since undulant fever is often characterized by natural remissions, the value of any therapeutic measure must be interpreted with caution.

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THE RÔLE OF VITAMINS IN NUTRITION*

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ARE vitamins above suspicion? I have been reading "100,000,000 Guinea Pigs" by Arthur Kollet and F. J. Schlink. Although their picture of the American people as testers of unfit and poisonous foods may be exaggerated, there is much truth in the authors' contentions. It seems to me that vitamins have been made the excuse for many millions of guinea pigs. As you search through the advertising pages of any magazine, notice how many of the foods and tonics advertised offer richness in vitamins as their "raison d'etre." How much of this is justified, and what is the real place of vitamins in the plan for improving the health of humanity?

I will try to answer partially those questions by a résumé of our present knowledge of the vitamins and their effects upon metabolism. Since it is known that they exert a profound influence upon the body mechanism, it should always be kept in mind that the vitamins must be studied not as isolated forces, but in their relation to all metabolites. Like the hormones, food materials are so interrelated that they must be considered as parts of a complex whole.

A diet is now considered complete only when it contains balanced amounts of complete pro-

*From the Department of Botany, University of Minnesota. Presented before the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 23, 1933.

TABLE I. EFFECTS OF VITAMIN DEFICIENCIES*

Name of vitamin	Chemical characters	Richest sources	Results of deficiency
A "Antikeratic"	Fat-soluble Heat-stable (Carotene = provitamin A)	*Cod liver oil;* milk and dairy products; egg yolk; glands (especially liver); green leafy vegetables	Xerophthalmia; epithelial metaplasia; growth failure; emaciation; loss of vitality; sterility; urolithiasis; increased susceptibility to pyogenic infections (especially of visual, respiratory, digestive and genitourinary tracts), and (possibly) to neoplasms.
B (B_1) "Antineuritic"	Water-soluble Heat-labile (especially in alkali)	*Yeast;* whole grain cereals; fresh fruit and vegetables; egg yolk; glandular organs	Polyneuritis and (probably) human beriberi; paralysis; digestive disturbances; cardiac weakness; emaciation; growth failure; anemia; impaired lactation.
C "Antiscorbutic"	Water-soluble Heat-labile (Hexuronic acid?)	*Citrus* fruits; tomatoes; some other fruits and vegetables; sprouted grain	Scurvy; growth failure; lowered vitality; capillary degeneration; hemorrhages and anemia; impairment of teeth; skeletal, muscular and visceral degeneration; secondary infections.
D "Antirachitic"	Fat-soluble Heat-stable (Ergosterol = provitamin D)	*Irradiated ergosterol;* cod liver oil; egg yolk; irradiated foods; milk and butter	Rickets and osteomalacia; disturbance of calcium-phosphorus metabolism and ossification; dental caries; weakness and predisposition to infections.
E "Antisterility"	Fat-soluble Heat-stable	*Wheat germ* oil; whole grain cereals; green vegetables; muscle; glandular organs	Sterility, due to gonadal degeneration in male and imperfect placentation in female; embryonic death and resorption; muscular dystrophy; paralysis in young.
G (B_2 P-P) "Antipellagra"	Water-soluble Heat-stable	Yeast; liver; lean meat; milk, eggs; wheat germ; green vegetables	Pellagroid disorder in animals and (probably) human pellagra; dermal, digestive and neural lesions; weakness and growth failure.

*The author is indebted to Dr. C. M. Jackson, Department of Anatomy, for the use of this table. Only a few minor changes have been made.

teins (with all essential amino acids), digestible carbohydrates and fats, complete salt mixture and all the vitamins. Roughage is a usual constituent. There are at present six vitamins which are so well established that we know something about the effects of their absences from the diet. Many more factors are suspected as essential for the pigeon or for the rat. These have been given such names as B_3, B_4, B_5, Y-factor, Physin, et cetera.

It is an interesting commentary on our knowledge of the vitamins that although we know the pathological effects of their lack, we know practically nothing of their normal physiological activity.

Table I summarizes some information about the well established vitamins. They are listed alphabetically, and each vitamin is named after the pathological effect which is most specifically due to its absence. Most of the vitamins are so intimately associated with general body functions that they effect growth, nervous system and well being. A further grouping is often used, there being three water soluble substances (B, C and G) and three fat soluble (A, D and E).

Although until a few years ago no vitamins had been crystallized, such rapids strides have been made in the technic of micro-isolations that now possibly three are known in pure form—B, C and D.† Since some of these molecules are not extremely large, we may logically expect that in a short time some synthetic vitamins will be available. Already it is possible to substitute the yellow pigment carotene and irradiated ergosterol for vitamins A and D respectively. But when the above six vitamins are on the market in pure form, it will not be possible for animals to live on purified diets of protein, carbohydrate, fat. salts and the vitamins. Results with synthetic diets indicate that as purification takes place, the number of unknown dietary factors increases. Therefore, the best way to give an adequate diet is to supply a well diversified mixture of high grade natural foods—that is, plant and animal products which have received as little treatment and purification as possible.

It is true that the large part of nutritional research has been done on the young animal. This is the time of most rapid growth and development. Therefore, vitamin reserves are

†Since this was written, the isolation of vitamin A has been made by Karrer. The molecular structure of the vitamin is said to be established.

quickly exhausted and the effects of malnutrition are easily produced. From this work we know of the extensive malformations due to rickets, blindness following xerophthalmia, and poor growth due to low vitamin B. It is clear that the most critical test of nutrition is during the period of infancy, when the child is growing rapidly indoors and is dependent largely on a single food supply, milk. Although milk is the most complete and readily assimilated food known, still it is far from a perfect food. Among the well known deficiencies of milk are vitamins A, D and B and iron. The deficiency in B becomes more pronounced as the mother's diet is purified. It is now quite clear that an undernourished mother will either produce a milk of poor nutritional quality or will produce too little milk to satisfy the needs of the infant.

Of adults, the female is more likely to suffer than the male. This is due to the great nutritional demands of pregnancy and lactation. Shortages of calcium are most common. Except for this period of strain, adults are able to live for a long time on very deficient diets without noticeable effects. Since the average adult is capable of digesting a wide variety of dairy products, meats, vegetables, fruits and nuts, there would be no cause for worry about the adults' diet if it were possible to persuade people to eat a good selection of unpurified foods. The third column of Table I shows that a mixed diet made up of the above foods would be rich in all the vitamins and the probability of development of any known dietary deficiency on this diet would be small.

Two most valuable dietary constituents. sucrose and fat, become dangerous if consumed in too large quantity because they displace foods rich in good protein, minerals and vitamins. White flour and potatoes suffer from the same limitations. Therefore, it is quite possible even for adults to be undernourished while consuming adequate quantities of food. Herein lies a real danger. The adult does not quickly show effects of malnutrition which can be readily diagnosed. The trend of opinion of nutrition workers is that many people suffer from low vitality and high susceptibility to infection because they are not properly nourished. New methods of diagnosis of deficiencies of vitamin C have revealed large and unexpected numbers of sufferers from the lack of this fresh fruit and vegetable food-material. One of the greatest needs of nutrition today is methods of early diagnosis of small deficiencies. Our present information is largely based on extreme rat and guinea pig tests. We know almost nothing of optimum conditions for the human being.

Our safest course at present is to diversify the diet, including liberal quantities of milk products and fresh foods from land and sea. If this is done, there is little justification for making ourselves the guinea pigs for testing costly and uncertain products now advertised largely for their vitamin content.

THE SKIN MANIFESTATIONS OF AVITAMINOSIS*

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THE discovery of vitamins opened a study of extraordinary interest to medicine as a whole; the subject is a comparatively new one and is still in a state of flux, with new discoveries still being made.

When not enough vitamins are present in the diet certain pathological conditions result and certain diseases occur. McLester[5] gives as the deficiency diseases — xerophthalmia, beriberi, scurvy, rickets, osteomalacia, pellagra, simple goiter, xanthosis and general malnutrition, and of these certain ones show interesting dermatological conditions.

In xerophthalmia or keratomalacia, a disease due to a deficiency of vitamin A, Frazier and Ch'uan-K'uei Hu[4] reported some interesting observations. In the winter of 1928-1929 many cases of keratomalacia were seen in the Hospital of the Peiping Union Medical College. Most of these were Chinese soldiers who had been on a diet deficient in animal proteins and fats.

*From the Minneapolis General Hospital and the Department of Dermatology and Syphilology, University of Minnesota. Presented at the annual meeting of the Minnesota State Medical Association, Rochester, Minnesota, May 23, 1933.

In addition to the signs of keratomalacia, most of these patients showed certain cutaneous lesions of such uniform character as to suggest their being of more than coincidental significance.

Histological examination of the lesions in various stages of growth showed the pathologic process to be essentially one of hyperplasia and hyperkeratinization of the epithelium of the

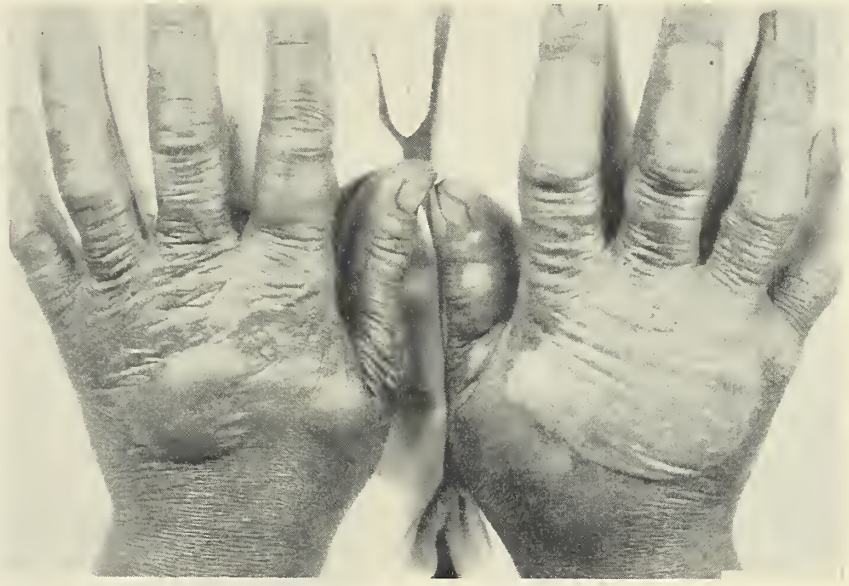


Fig. 1. Pellagra. Backs of hands showing huge bullæ.

Histologically they were analogous to the pathologic changes seen in the eye and in other tissues of animals and man following deprivation of fat soluble vitamin A. As a rule these lesions preceded the eye symptoms and responded to dietary therapy simultaneously with the ocular lesions, although much more slowly.

Several weeks prior to the onset of the ocular symptoms the skin became dry and rough and later spinous papules appeared at the sites of the hair follicles. The upper and lower extremities were involved, also the shoulders, lower abdomen and, to a less extent, the chest, back and buttocks. The skin was darker than normal in some cases. There was absence of visible sweating and the articular folds, usually moist, were covered with dry delicate scales.

The follicular papules varied in size and each had as its apex a hard keratotic plug which projected above the surface of the lesions as a spinous process. The eruption was usually abundant and symmetrical.

Fifteen patients were observed and five of them showed extensive suppuration. Large numbers of comedones were present on the face but, unlike in acne, the skin was very dry.

epidermis and hair follicles with associated metaplasia of the epithelium of the many sweat ducts to the keratinizing type, degeneration of the glandular structures of the skin, and infection.

From the fact that the histological changes in the skin resembled the changes seen in the eye, where there is cornification of the conjunctival and corneal epithelium, they assumed a strong probability of the specific nature of the cutaneous lesions.

However, Nicolau[6] and Willshire[8] described cutaneous changes essentially identical with their series of cases, as a manifestation of scurvy.

Frazier concludes that in correlating tissue changes with a specific vitamin deficiency, it should be remembered that single dietary faults rarely occur alone, inasmuch as a diet which is lacking in one factor is generally deficient in others.

In beriberi the only cutaneous change of note is edema.

Scurvy was the first disease that was recognized as having a dietary etiology. It has been known for many years and there is a voluminous literature concerning it. The commonly known skin manifestations are subcutaneous hemor-

rhages, bluish areas, also ulcerations and hemorrhages in the mouth.

Nicolau[6] described a follicular and perifollicular eruption in scurvy. He found a dry skin

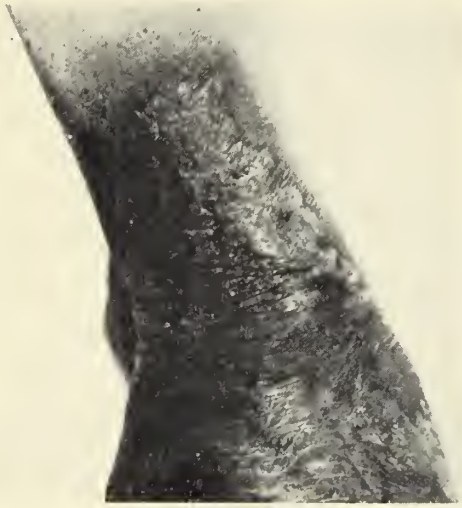


Fig. 2. Pellagra. Wrist showing sharp line of demarcation and heavily pigmented skin.

with numerous follicular hyperkeratoses on the extremities. Later pustulation can occur.

Willshire[8] studied 3,000 cases in Serbian troops. He found dryness of the skin, petechiæ, and follicular hyperkeratoses. The distribution was usually on the lower extremities but the upper extremities were also involved though to a lesser degree. He thought the pathologic changes were due to impairment of the follicular nutrition. Both Nicolau and Willshire stressed the value of these skin findings in making an early diagnosis of scurvy.

Xanthemia and Xanthosis.—Eating large quantities of vegetables and other foods which contain carotene and xanthophyll may lead to an accumulation of these pigments in the blood. This is called xanthemia and may in turn cause xanthosis, a yellowish pigmentation of the skin. This is most intense on the palms and soles and at the nasolabial folds. It occurs most often in diabetic and nephritic patients. We have had two such cases at the Minneapolis General Hospital. The condition has also been called carotinemia. Carotene and xanthophyll are normal constitutents of the blood and contribute to color the blood serum yellow.

Carotene is primary vitamin A and is converted in the body into vitamin A. Its toxicity has been tested and after extremely large doses have been given over a long period of time no deposit of yellow pigment has been produced in

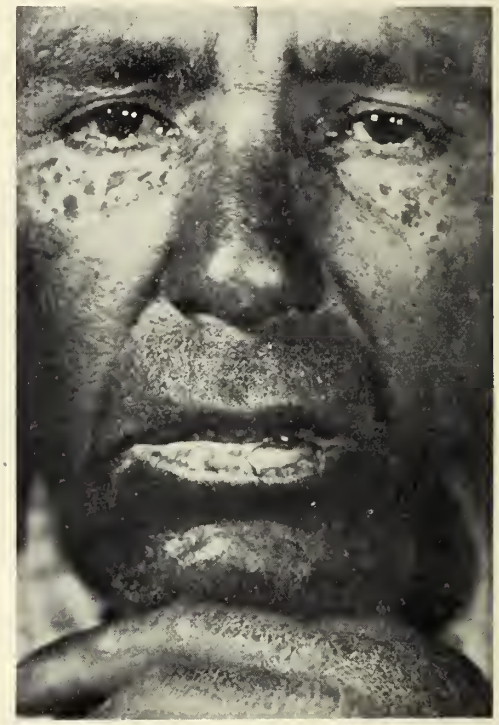


Fig. 3. Pellagra. Lesions on back of hand, face and lip.

the skin. This suggests that this so-called xanthosis may be due to xanthophyll instead of carotene.

Eusterman and Wilbur[3] have recently pointed out the versatility of vitamin A and have given an excellent review of the subject. Xanthosis is not, strictly speaking, a deficiency disease but seems to be due to some other metabolic disturbance with a pigment deposit in the skin. This pigment may be due to carotene or, what is more likely, to xanthophyll.

Pellagra.—Pellagra according to Crutchfield[2] is characterized by a bilateral, symmetrical, pigmented and scaly eruption which is preceded by erythema, edema and inflammatory infiltration.

Ormsby's description[7] is a classic. The eruption starts as a macular erythema which fuses and forms a patch of dermatitis almost identical with a sunburn. In a few days the color of the lesions deepens and they assume a reddish brown or chocolate hue. In from seven to ten days a

desquamation begins at which time a roughened, scaly surface is present. Early in the process there is moderate swelling. In the more active cases, on the erythematous base there develop bullous lesions which often attain huge size and which, after a few days, gradually dry leaving a thickened, crusted epidermis. Ecchymoses may complicate the process and secondary pyogenic infection may follow the vesicular or bullous cases. In severe cases ulceration may ensue and in many the edema is sufficient to cause fissures. Whether erythematous or bullous, the lesions are well defined. After the eruption has disappeared, the skin in some cases is pigmented; in others the pigment is lessened.



Fig. 4. Pellagra. Depigmentation of hands after bullæ were healed.

In certain cases where the process is less acute the appearance of a chronic dermatitis with marked hyperpigmentation is presented. After repeated attacks the skin becomes permanently thickened, hard, roughened, scaly and pigmented. The terminal stage is a thin, parchment-like scar, *i.e.*, atrophy.

The lesions are found on the exposed areas of the body chiefly, on the back of the hands, wrists, some parts of the face and neck. The feet and ankles are rarely involved here, but they are often seen in Europe where more people go barefooted. The arms and chest and, to a lesser extent, the ears and other parts of the body including the palms and genital region are also involved.

The lesions are strikingly symmetrical and the eruption on the hands and wrists has often been compared to that of a glove.

The sun seems to be a factor in determining the location of the eruption. In mild cases the tongue is red and swollen and presents smooth areas, especially at the tip and on the margins. In severe cases the tongue can show ulcerations which bleed easily. The buccal mucous membrane may also be involved.

From 1926 to 1932 inclusive there were observed at the Minneapolis General Hospital fifty-five cases of pellagra. These cases were all strikingly similar and all had the same etiological factors. They all were from the lowest human strata and all gave a history of long and excessive alcoholism. Most of them drank denatured alcohol; some used canned heat and obtained the alcohol from that. These patients all were seen in the summer months and the exciting cause was usually a more than ordinarily severe drunk and a subsequent sleep on the grass in the hot summer sun. These patients were all men and almost without exception admitted that, during their prolonged debauch, they ate very little, if at all.

The areas involved were the backs of the hands and wrists, sometimes the forearms, the face and neck. The tongue was usually red and swollen. Diarrhea was present in 25 per cent of the cases. Mental apathy was seen in only a few cases.

Clinically they were all characterized by a

severe edema of the backs of the hands and in almost every case bullæ were present. Sometimes these bullæ were so large as to lift the epidermis from the entire back of the hand. The bullæ were always infected and the areas involved were darkly pigmented. On resolution, a dry, dark, scaly skin was left.

Our treatment was wet antiseptic packs for the infected bullæ and high vitamin feeding. The lesions healed in from one to two weeks, and all the patients made a good recovery.

To test the effect of light, some of the patients were exposed to the ultraviolet lamp on areas of the body not involved with the disease, but, the results were negative. Patch tests of canned heat were also made in some cases but these tests were also negative.

In the year 1933 so far, two other cases of pellagra have been seen, both of the simple pellagra type. One of these men had been on a fairly good diet but had eaten a lot of canned food. He was in good physical condition except for the skin eruption and had no other symptoms. The other man was an old sheep herder who had been living on hardtack and bologna. He had a chronic type of pellagra with roughened, thickened skin over the hands and arms. There was no diarrhea but he was mentally upset.

This makes a total of fifty-seven cases of pellagra seen. All of them were males, fifty-five were of the alcoholic type and two were simple pellagra.

Boggs and Padget[1] analyzed the cases of pellagra seen at Johns Hopkins Hospital in the last twenty years. They divide pellagra into three classes: (1) the simple pellagras; (2) the post-alcoholic variety, and (3) pellagra arising as a complication of some other preceding disease. They observed no difference in the three types but considered them all as pellagra. Out of 102 cases they had forty of the alcoholic type, thirty-one of the simple type, and thirty-one complicating other diseases. They suggest that either the alcohol itself destroys the pellagra preventing factor in the gastrointestinal tract, or that the gastrointestinal tract is so altered by the large amounts of alcohol that it is incapable of assimilating the pellagra preventing factor.

My own opinion is that the alcoholic pellagras are real pellagras and that they are caused by lack of vitamins and especially vitamin G. These patients practically starve and in this they approach the pellagra caused by some other disease such as intestinal carcinoma.

One thing must be kept in mind when prescribing reducing diets. A long deprivation of certain essential foods may, in certain susceptible individuals, cause pellagra.

Conclusions.—In vitamin deficiency and nutritional disorders the skin is involved along with the rest of the other organs. It suffers in the same way and the symptoms can be largely explained on the grounds of a deprivation of some substance essential to the general body welfare.

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EYE MANIFESTATIONS OF AVITAMINOSIS*

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THE purpose of presenting this paper is twofold:

1. To give a brief summary of the eye manifestations of vitamin deficiencies.

2. To give the results of an investigation to determine the relative frequency of such eye disorders in the state of Minnesota.

The eyes are definitely affected by vitamin deficiency. Practically only one—Vitamin A—is involved. Recent work by O'Brien[10] offers an exception to this statement. He has produced cataracts of all types in young rats by the feeding of a diet free from Vitamin G (B^2, antipellagra). Whether or not the deficiency of Vitamin G is a factor in human cataract formation is not known. However, the symptoms as well as the underlying pathological changes resulting from Vitamin A deficiency are quite well determined, both in experimental animals and in humans. The most characteristic symptoms appear in the eyes and for this reason the diseases are of particular interest to the ophthalmologist.

Vitamin A seems to be necessary to keep epithelial tissues and tissues of epethelial origin "healthy," and the absence of Vitamin A affects such tissues, some more than others, in a characteristic way.[3] Cuboidal, cylindrical, or transitional cells change into the squamous keratinizing type; this change is not due to inanition but to a real metaplasia. The deepest cells of the layer are affected first and the process gradually extends to the surface. If this surface is exposed to the outside, as in the case of the epithelium of the respiratory tract or of the conjunctiva, infection often takes place and then symptoms, which up to this stage may have been absent, appear.

In the conjunctiva, the first stage is the disappearance of the goblet cells and later changes in the cells transform the epithelium and make the structure similar to epidermis. These changes manifest themselves at first by just a stickiness of the lids; later the conjunctiva becomes dry and white, and glistening spots appear (Bitot's spots), often covered with a whitish foam. Tears do not seem to moisten the spots and the surface acts as if it were greased. This condition is known as xerosis of the conjunctiva and cornea, or xerophthalmia. The conjunctiva becomes thick and lies on the eyeball in folds. Later the process advances in the cornea which becomes more cloudy; then there is a softening and breaking down of the corneal tissue, keratomalacia; and the ulceration advances until the cornea ruptures; infection takes place and there is finally blindness.

Pillat,[13] of China, describes two other symptoms which may appear independently of any other manifestations but only in individuals who have been exposed to partial Vitamin A deficiency for a long period: one, a mild dryness and cloudiness of the cornea, which he terms prexerosis, and the other a characteristic brownish-gray pigmentation of the conjunctiva which persists long after the Vitamin A deficiency has terminated.

Coincident with these eye changes, symptoms referable to the other epithelial tissues may be present, such as respiratory disorders, coryza, sinus infections, bronchitis, gastrointestinal symptoms, hematuria, etc.

Slowness of movements and mental sluggishness is mentioned and is explained by some involvement of nerve tissue on the basis that nerve tissue is of epithelial origin.

Night blindness or hemeralopia, meaning a normal vision in ordinary light but a much reduced vision in dimmed light, often occurs with or independent of other eye symptoms. This symptom is found in various diseases of the retina and optic nerve. Usually there are lesions which can be observed objectively, but in the case of night blindness from Vitamin A defiency, there are no changes of the retina demonstrable with the ophthalmoscope or in any other way. For this reason this form of night blindness is often termed idiopathic hemeralopia. Vision in dim light is largely dependent on the proper functioning of the periphery of the retina. Holm[6] demonstrated first in 1927 that the retina

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holds and stores comparatively large amounts of Vitamin A. Knowing that Vitamin A is a fat soluble substance and is associated with fatty substances, it is assumed that it is held by certain lipoids which are found in the retina only in the periphery.

Idiopathic hemeralopia[1, 2, 16] disappears promptly if Vitamin A is restored to the diet; xerophthalmia also disappears quite rapidly and corneal ulcers will heal, but if corneal tissue is destroyed, it will not be restored and cloudiness of the cornea will remain permanently.

These eye diseases due to malnutrition are not new but have been recognized as entities for a long time. Even Heroditus knew of idiopathic hemeralopia, and recommended as treatment "raw ox liver dipped in honey as much as he is able." During the Great War these diseases were found in larger or smaller groups of people which had become isolated for some reason and had been deprived of proper food supplies.

During the years from 1909 to 1920, inclusive, there were recorded more than six hundred cases of xerophthalmia and night blindness in Denmark. Blegvad,[2] a Danish ophthalmologist, in working over these records, first traced the cause to a lack of Vitamin A in the diet. His work furnishes a most fascinating story in the history of medical research.

Pillat,[11] of Peiping, China, in trying to determine the normal pigmentation of the conjunctiva in the Chinese, had great difficulty in finding Chinese individuals with normal conjunctivae because of the almost universal lack of Vitamin A in the Chinese diets.

Aykroyd[1] states that in the summer of 1929 he observed night blindness in New Foundland and Labrador in a group of people whose diet consisted of white bread, molasses, fresh cod muscle, salt meat, beans, peas, and some potatoes, with no milk, butter, eggs or green vegetables. Night blindness developed in less than a month on this diet. In those regions cod liver oil is strictly an article of export. All the cases were cured in from twelve to thirty-six hours by one or two doses of cod liver oil.

Riemer[16] reports the landing at Boston of a crew of nineteen sailors from a boat which arrived after a long voyage from the west coast of Africa. The crew had lived on a very similar diet to that just described and all the members suffered from malnutrition. There were two cases of night blindness and three cases of xerophthalmia.

In looking over the medical literature of the United States, there are otherwise very few cases reported. In 1927 a young man suffering from night blindness came to my office; after much investigation, the conclusion was reached that the lack of Vitamin A in his diet lay at the basis of the trouble. Although constantly on the lookout for similar instances, none has appeared since.

On the suggestion of Dr. Alvarez, an attempt has now been made to find out the relative frequency of these disorders in the state of Minnesota. For this purpose the following questionnaire was formulated:

I am attempting to determine the frequency of eye disorders in Minnesota and in neighboring states, due to deficiency of Vitamin A in the diet.

It would therefore be highly appreciated if you would indicate on the blank below whether or not you have seen any such cases. If you have, a brief statement of each case, giving especially the symptoms and findings as to the eyes and the nature of the diet used by the patient, would be of great value.

Number of cases of eye disorders traceable to malnutrition (specifically to Vitamin A deficiency in diet).

1. Xerophthalmia (dryness of conjunctiva and cornea)
2. Keratomalacia (cloudiness and softening of the cornea)
3. Hemeralopia (night blindness)

This questionnaire was sent to one hundred and twenty-five ophthalmologists and thirty-one pediatricians and internists in the state, a total of one hundred and sixty physicians.

Fifty-six replies were received. Forty-eight physicians had seen no cases. Nine physicians reported a total of seventeen cases (including my own) which in their opinions could be put under this classification.

In studying these reports, it was found that the cases naturally fall into two groups:

Group I.—Eye disorders associated with malnutrition, but complicated by other eye diseases (eleven in all).

Two cases of *retinitis pigmentosa* were reported. This disease seems to be of congenital origin, is characterized by night blindness and shows, as a rule, very definite retinal changes. One of these patients, a girl, aged six, with petit-mal, was placed on a ketogenic (high fat) diet with a remarkable improvement in vision.

Whether or not it was thought that Vitamin A had anything to do with this improvement was not stated.

Seven cases were reported as xerophthalmia or pemphigus. Ocular pemphigus is a rare disease and in common with general pemphigus has an unknown causation, but there is nothing to indicate that avitaminosis is a factor.

One case, a child eighteen months old, was diagnosed *keratomalacia.* No statement as to diet was made except that the child had had artificial feeding. It had always appeared weak. There were excoriations of epithelium and deep infiltrations of both corneæ, leading to final perforation and loss of the left eye. There existed also an increased intracranial pressure and a paralysis of the fifth nerve.

A pediatrician reported the case of a young child with malnutrition, cloudiness of the cornea and caries of the teeth. There were also mental deficiency and other congenital defects and he found it difficult to say how much of the eye trouble was due to malnutrition.

Group II. Cases of eye disorders due to malnutrition but without definite complications (six in all).

A girl baby, fourteen months of age, weighed four pounds at birth. She had been on a diet of lactic acid milk with addition of karo, and also on a diet of whole milk with dextro-maltose and had gained up to seven pounds. At the time of this illness, she was small, poorly nourished, and had bilateral corneal opacities and a staphyloma of each cornea. A purulent ophthalmia was also present in each eye. She had a respiratory infection and signs of rickets. In spite of all treatment, an evisceration of each eye finally had to be done.

One patient reported, a woman twenty-eight years of age, had dendritic ulcers of the cornea. She was very anemic and poorly nourished, having reduced her weight thirty pounds by means of a starvation diet. The usual local treatment was given and the patient placed on a diet rich in Vitamin A. In a few weeks the ulcers had healed completely—a very short course for dendritic ulcers.

In a girl of three and a half years, ulceration of the cornea had been present for two years in one eye and for two weeks in the second eye. Nothing was stated as to her diet, but she was given a nourishing diet with high Vitamin A content. Five weeks later the ulcers had healed.

A patient with xerophthalmia (age not given) whose diet had consisted mostly of carbohydrates, sweets, starches, no butter and no fats was given a diet of meats, liver, vegetables, and cod liver oil and became entirely well in three months.

In another case of xerophthalmia with stapyloma of the cornea and blindness there was no record of the diet except that it was inadequate as far as Vitamin A was concerned.

The author's case of hemeralopia is given below in detail.

In the first group, it is very difficult to evaluate the factor of malnutrition, since other eye diseases were present which could have produced the symptoms present. That leaves the second group—only six cases—for consideration.

There are two ideas gained from this investigation which seem to me to be of some value:

1. Eye disorders from Vitamin A deficiency are very rare in the state of Minnesota. This investigation is admittedly incomplete, but not as incomplete as one might at first glance suppose. It is true that the greater number to whom the questionnaire was sent did not respond; on the other hand, it can be safely assumed that these had no cases to report. It may be that some cases had not been recognized; but several physicians who reported having seen no cases added that they had seen cases of this nature elsewhere. Considering that this survey likely covers a period of from five to ten years, it traces only about one case per year out of Minnesota's population of over two million. In spite of the reports of suffering from lack of food during the present period of depression, our people must have been fed quite well.

2. Some eye disorders that are not now thought to be due to Vitamin A deficiency may be favorably influenced by the use of food rich in Vitamin A, and there is justification for trying this diet in chronic diseases such as retinitis pigmentosa, dendritic ulcers and others.

Grateful acknowledgment is hereby made to those of my fellow physicians who so kindly cooperated with me in this survey.

The following report of a case of hemeralopia is given:

N. M., male, aged twenty-one, came to me on June 20, 1927, complaining that he could not see at night. He first noticed difficulty in driving a car at night in

that he could not see the road. Later on he found that he could not see anything after dark. He could not see the door of the garage nor even the barn. He was compelled to give up being out-of-doors at night. In the daytime his vision was good and caused him no trouble in reading excepting when he read a great deal. He had no inflammation or redness of the eyes excepting occasionally when driving a car in the wind. In every other way he was well and "strong as an ox" and had no difficulty of any kind.

His habits were good: he did not smoke or use alcohol. He had not taken medicines of any kind previous to the onset of this trouble. According to his own statement, his dietary habits were good—he "ate everything."

His past history was entirely negative. He was employed by his father in the grain and feed business. His father and mother were living and well, and four sisters also.

The patient was a large man, well nourished and weighed about 180 pounds.

His eyes were entirely normal objectively; the media clear; fundi entirely normal; vision in each eye 20/20+. There was no refractive error of any importance. The fields were taken carefully and were found to be markedly contracted on all sides both to light and to colors. He could see all colors and they were present in their normal order.

There was nothing to explain his trouble. At a second visit, a much more careful inquiry as to the diet was made but nothing definite could be elicited, excepting that he admitted that he never ate liver. In spite of this, he was ordered to take cod liver oil, to eat liver and to take butter and cream and eggs in addition to his ordinary diet.

Shortly after that a sister of his came into the office and from her an entirely different story was obtained. She stated that the patient was the only boy in the family and that he had always had his own way and had been allowed to eat anything he pleased. His diet ever since childhood had been about as follows: He ate sweets in great amounts, candy, jelly, cookies, cake, but never pie. He liked hot rolls and often would eat as much as a panful at a time and drink large amounts of black coffee with them. Of meats, he took only pork which he liked in the form of chops and ham. Occasionally he would accept other meats but then only when fried very hard. He was very fond of peanut butter but avoided butter and cream; he drank milk only in small quantities and then only if it was very thin. He ate no eggs. He refused all vegetables and fruits as well, excepting occasionally a banana or an apple.

If this diet is examined, we find that it contains very little of Vitamin A.

How any child could choose by instinct, or perversity, a diet so as to avoid Vitamin A so effectually is hard to understand.

A report of this patient received in April, 1933, states that after his last visit he increased the variety of his diet and that his night blindness disappeared promptly and had not returned at any time since.

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SYSTEMIC MANIFESTATIONS OF AVITAMINOSIS*

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IN discussing systemic manifestations of avitaminosis it must be borne in mind that while deficiency of a certain vitamin does produce more or less specific manifestations, the various vitamins have common functions, and inter-relationships do exist. However, for the purpose of this symposium, I will discuss the subject in relation to the individual vitamin.

Lack of vitamin A is chiefly concerned with xerophthalmic changes and night blindness, but animal experiment points to other interesting possibilities. It has been noted that vitamin A deficiency produces a marked susceptability to respiratory infections. Vitamin A seems to be a physiologic prophylactic against such infection by maintaining the integrity of the epithelial linings of the mucous tracts and skin. Once the infection has occurred, however, there is a good deal of difference of opinion as to the curative value of vitamin A therapy. Certainly no adequate proof has so far been submitted. The question of therapy is of particular interest to clinicians in relation to the so-called "common cold," but at the present time the prophylactic role must be given precedence. It has also been noted experimentally that vitamin A deficiency brings about a high incidence of renal calculi and a loss of the power of reproduction. Although these conditions may have their counterpart in man there is not sufficient evidence on which to recommend vitamin A therapy. Also certain types of secondary anemia are suspected of being associated with lack of vitamin A. It is well to call your attention to this fact in relation to prolonged regimes on poorly balanced diets such as are often used in cases of ulcer, nephritis and hypertension.

Lack of vitamin B, Bl or F is usually associated with neuritic changes. Extreme deficiency is characterized by multiple neuritis, edema, loss of appetite and cardiac weakness and this syndrome is pathognomonic of only one condition, beriberi. Beriberi is a disease of great antiquity and is endemic in the tropics and the orient where rice is the staple article of diet. The disease is unknown in America, except for imported cases. It should, however, be emphasized that ordinary neuritis is not a phenomenon of vitamin deficiency. Moderate deficiency of vitamin Bl gives a rather confused picture but the one outstanding symptom is anorexia. This symptom of loss of appetite is worthy of our special consideration because it is a complication of many diseases and its occurrence is often unrealized. These cases in my experience give the most gratifying results upon receiving a liberal supply of vitamin B. Growth and lactation are also very dependent on an adequate supply of this vitamin. Attention should be called to the observation of bradicardia developing in rats on a diet low in vitamin B and also the effects on the central nervous system, as is shown by the diminished maize learning ability of the rat.

Vitamin C apparently maintains the integrity of the vascular endothelium and is necessary for tooth formation and bone metabolism. Severe deficiency of vitamin C results in the classical picture of scurvy. Scurvy is one of the earliest known deficiency diseases. Hippocrates refers to it. It was prevalent among the Crusaders in the 13th century and history is filled with accounts of its devastating effects when groups of people were subjected to a rather strictly limited food supply. From the time of Hippocrates until as late as 1830 it was generally believed that all the animal and vegetable products which serve as food contained the so-called universal aliment. It is interesting to note that in 1795 the British navy allowed a ration of lemon juice to all sailors and the incidence of scurvy decreased immediately, but the merchant marine did not adopt the ration until 1865 and continued to have a large incidence of scurvy. In 1883 it was established that adult and infantile scurvy were the same entity, but it was not until the work of Holst and Froelich in 1907 that scurvy was definitely attributed to an accessory food factor.

Scurvy presents two fundamental types of lesions: (1) localized hemorrhage; (2) fragility of the bones. The condition is the result of a deficiency of the cementing substance between

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the endolethial cells and the blood vessels are weakened. Blood escapes into the various tissues and cavities producing hematomas of varying degrees everywhere. The gums become ulcerated and the teeth loosen in their sockets. The long bones fracture and form large calluses. Sub-periosteal hemorrhage is common, especially in the distal end of the femur and tibia. There is a deficient production of organic matrix so that mineralization cannot occur. The diagnostic criteria are as follows: (1) sallow skin (changes in complexion); (2) easy fatigue; (3) breathlessness; (4) pain in the joints often attributed to rheumatism; (5) hemorrhagic spots or large eccymoses especially in the extremities where bruises occur; (6) puffy, hemorrhagic and ulcerated gums. Complications such as pneumonia and enteritis are serious and account for nearly all the deaths.

Although scurvy is uncommon in America, except in artificially fed infants, the report of one case from the literature will emphasize the fact that the early symptoms are often obscure and that many early cases are being overlooked. The case is that of an adult suffering from duodenal ulcer who had been placed on the usual restricted diet plus alkali and who during the course of his treatment developed arthritis with purpuric spots. The case was variously diagnosed "rheumatism," "arthritis with pyorrhea" (all teeth were removed), and "rheumatism with purpura," before it was realized that the case was one of scurvy. Proper attention to the vitamin content of the diet was undertaken and the patient promptly recovered from his rheumatism.

Vitamin E is one of the least known of the vitamins, but experiments have shown that vitamin E deficiency results in sterility and if the deficiency is allowed to become extreme, the sterility is permanent. These facts have not been investigated in relation to man.

There are two conditions that are often considered manifestations of vitamin deficiency. The first is non-tropical sprue. A case is reported from the South where favorable results were attributed to intensive vitamin B therapy. This patient, however, was also on a special balanced diet and this was probably the only factor in the reported cure. Th. E. Hess Thaysen of Copenhagen in his latest book, *"Non-Tropical Sprue,"* just off the press, reviews the whole subject of non-tropical sprue and states that there is no proof that vitamins are a primary factor in this disease and he is of the opinion that there is no specific therapy. He gives in detail five specific diets and advises the trial of all if necessary. The second condition, nutritional edema or "war dropsy," has been suspected of being a vitamin deficiency disease, but the consensus of opinion at the present time is that it is due to a diet containing insufficient protein and an excess of fluids and salts. Treatment of these cases with high vitamin diet has not been successful.

SUMMARY

1. In my experience and in the experience of others avitaminosis is very rare in Minnesota. There does not appear to be any increase because of the present economic conditions.

2. Vitamin A is undoubtedly a prophylactic against respiratory infections but its curative value after the infection is acquired is very doubtful.

3. Prolonged use of milk and restricted diets as in the treatment of ulcer, nephritis and hypertension is prone to produce rather severe anemias that can be avoided by proper attention to the vitamin content of the diets.

4. Moderate vitamin B deficiency has one outstanding symptom: anorexia. All patients with loss of appetite should be given an adequate vitamin B intake. The results are often gratifying.

5. Many early cases of scurvy are being overlooked and it is well to remember that atypical arthritis and purpura, especially in those on a restricted diet, may be a mild scurvy.

6. Non-tropical sprue and nutritional edema, or "war dropsy," are not vitamin deficiency diseases.

TREATMENT OF MALNUTRITION IN ADULTS*

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THERE is a large and important group suffering from semi-invalidism composed of individuals who have no demonstrable organic lesions other than a chronic state of undernourishment. These asthenic patients, in addition to manifesting symptoms of weakness, easy fatiguability, nervous depression, a lack of stamina, indefinite gastric symptoms often associated with visceroptosis, show a marked inability to gain in weight. They are chronically tired, and seem to lack the feeling of well-being, a condition so essential to good health.

In spite of the large incidence of such cases there is a surprising lack of attention paid to them by writers of textbooks and articles in medical literature dealing with the general and dietary treatment of diseases. Careful and complete discussions are given of the dietary management of the various diseases with great elaboration of the treatment of obesity, but very little is written on the subject of constitutional malnutrition. Very likely Dame Fashion determines to a great extent the disparity between the emphasis given to reducing people and that given to increasing the patient's weight. From the health standpoint there can be no doubt that the undernourished present an even more important problem than the obese.

The difficulty in the past has been that no matter what treatment was instituted it was often impossible to increase the weight of many of these undernourished individuals. The Weir Mitchell method helps many, especially for the relief of the nervous exhaustion, but this method is too difficult and too expensive for most patients, since it involves a residence of from six to eight weeks in a hospital under the care and supervision of trained nurses. And even under this classical management many patients fail to gain in weight or gain very little. Many others are put to bed in their homes and are treated with high caloric diets, plenty of rest, and tonics and sedatives, but as often as not there is no increase in weight.

The discovery of insulin has brought about a marked change in the management of undernourished patients. Many observers began to notice the rapid gain in the insulin-treated diabetics. The gaunt, emaciated, skeleton-like patient of the pre-insulin era was being replaced by a well nourished, at times even overnourished, individual. This change in appearance and general well-being of the insulin-treated diabetic patient suggested the use of insulin in nondiabetic undernourishment.

REVIEW OF LITERATURE

Within a year or two after the discovery of insulin favorable reports of its use in the treatment of undernourished children began to appear in the literature (Pitfield,[25] Marriott,[19] Barbour,[2] Fischer and Rogatz[11]). About this time (1925) there began appearing in the German literature reports of the excellent results obtained also in adults through what they called the insulin Mastkur. Falta[8] was the first to report beneficial results in his first cases treated. He used increasing dosage up to sixty units daily and in a few cases up to 100 units daily. In a later report[9] he claimed good results in asthenic patients, in liver disease, in postoperative emaciation, and in nondiabetic acidosis, especially of dehydrated patients. The patients developed a hunger drive through its use,—"Heiszhunger." Bauer and Nyiri[4] substantiated Falta's findings. Since that time a voluminous literature has sprung up relative to the use of insulin in nondiabetic undernourishment, at first only in the European literature but in recent years also in the American literature. Favorable results have been reported for its use not only in constitutional undernourishment but also for the undernourishment associated with a large variety of diseases. Lepine and Parturier,[17] and Lawrence[16] have reported favorable results in cases of hyperthyroidism. Hofhauser und Schön[15] and Morin and Bouessee[21] find insulin valuable in the treatment of incipient tuberculosis as well as in slow clinically progressive tuberculosis with undernourishment. The improvement in the appetite together with the resultant gain in weight greatly favor, they believe, the increase in the resistance to the dis-

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ease. Heaton[14] found that this method of treatment was of real value in chronic tuberculosis and quotes many authors to prove that the insulin treatment of undernourishment both in childhood and in the adult has become a well established therapeutic procedure. Thalheimer,[29] and Fisher and Snell[12] report good results in pre- and postoperative nondiabetic acidosis. Vogt[30] has reported his results in over 100 cases treated with insulin and so enthusiastic is he about this method that he believes it will supersede all other methods in the treatment of undernourishment. Frank[13] has treated ambulatory patients with similarly good results. Schellong and Hufschmid[27] noted the development of a hunger-drive together with increase in pancreatic secretion following injection of insulin. Wiechmann[31] feels that insulin is almost as valuable in non-diabetic conditions as in diabetic. Among the American authors may be mentioned Blotner,[5] Barker,[3] Nichol,[22] Metz,[20] Fancher,[10] and Short,[28] who report excellent results from the use of insulin and state that the insulin sharpens the appetite, increases the feeling of well-being and increases the weight and strength of the individual. Even those who do not gain in weight seem to feel a definite tonic effect from insulin. Nichol[22] found that many of the patients kept their weight for many years, but most of them for a period of about three to six months. Eighty per cent of his cases showed an immediate gain in weight. Appel et al[1] report good results in the treatment of thirty-one undernourished psychotic patients. These patients had failed to gain in weight under the usual management but after the addition of insulin, from forty-five to sixty units daily, there was an apparent improvement mentally as well as physically.

A great deal of work has recently been done to explain the manner in which insulin brings about these favorable results. It has been found that the effect of insulin on metabolism is far from a simple one. It does more than merely influence the utilization of the carbohydrates and fats within the body: Lueders and Watson,[18] after a careful study of eighteen asthenic undernourished patients with gastric symptoms found that insulin produces a heightened potency of the pancreatic enzymes, a greater secretion of bile and consequently a more complete digestion, absorption and assimilation of food. All of the patients gained in weight on the rich carbohydrate and fat diet with the aid of twenty units of insulin three times a day. Quigley[26] found that insulin causes a definite increase in gastric motility and tonicity accompanied by a prolonged hunger period. This effect is quickly inhibited by the introduction of sugar in the duodenum or by a subcutaneous injection of adrenalin or atropine. Bulatao and Carlson[7] also found that experimental hyperglycemia inhibits the normal gastric hunger contractions while insulin hypoglycemia increases the stomach tonicity and contractions. Okada et al[23, 24] have found that glucose by stomach or intravenously inhibits the secretory center of gastric, pancreatic and biliary juices, while hypoglycemia on the other hand accelerates it. It is not the insulin which acts directly to bring about these effects, but it is the resultant dextrose deficiency which evokes a stimulation of the secretory centers and thence through the autonomic nervous system the stimulus is carried to the active tissue cells. These observations help explain how the introduction of glucose into the stomach or intravenously produces a feeling of fullness and loss of appetite, as is the case for instance when a child loses its appetite from eating candy and sweets, for the presence of an increased amount of sugar in the blood inhibits the gastric, pancreatic and biliary motor and secretory functions.

PERSONAL EXPERIENCE

I have been interested in the use of insulin for the treatment of malnutrition since 1926 when I first saw Falta and Bauer administer it for the treatment of leanness. Since then I have used it for the specific treatment of undernourishment in a large number of cases of which thirty-two are listed in Chart I. In addition I have outlined my method of insulin treatment to a number of physicians who have reported very satisfactory results from its use.

Method of Treatment.—Most of my patients are hospitalized and a few of them carry out the treatment at home, while continuing their usual duties. In the hospital the patients are at first kept in bed and later are given bathroom privileges and finally are allowed to increase slowly the time of sitting up and the distances they walk. From the beginning they are placed on a concentrated high caloric diet of about 3,500 to 4,000 calories divided into three main meals and three lunches. The increase in diet is principally in

Chart I

Case No.	Sex	Age	Duration of Illness	Weight at Onset	Gain	No. of Days Treated	Insulin Dosage, Units	Condition on Discharge
1	F	28	1 yr.	90	11.5	32	20–15–20	Much improved.
2	F	40	12 yrs.	100.5	9	16	20–0–15	Much improved.
3	F	30	10 yrs.	60	4	12	20–20–20	Slight improvement. Little cooperation.
4	F	21	5 yrs.	104	6	12	20–15–20	Definite improvement.
5	F	68	1 yr.	99	19	39	15–15–15	Excellent results. Wt. 1 yr. later 136. Wt. 6 yrs. later 145.
6	M	31	3 mo.	115	9.5	16	20–20–20	Much improved.
7	F	27	8 mo.	101	3	17	20–15–20	Slight improvement. Severe headaches.
8	F	60	6 mo.	82	6	21	20–10–15	No improvement. Severe depression. Melancholia.
9	F	65	1 yr.	101	2 (loss)	43	20–20–20	No improvement. Melancholia. Tube-fed.
10	F	32	1 mo.	87	12	14	20–20–15	Greatly improved. 8 mo. later, 121, gain of 34 pounds.
11	F	16	1 mo.	.	some	17	20–15–15	Bedridden. Severe neurosis. No cooperation.
12	F	20	2 yrs.	92	13	33	20–0–20	Treatment continued at home. Wt. 2 mo. later 118. Felt well.
13 & 14 Twins	F	22	10 yrs.	94	11	20	25–20–20	Much improved. Wt. 4 mos. later 116.
	F	22	10 yrs.	91	11.5	20	25–20–20	Much improved. Wt. 3 mos. later 112.
15	F	31	1 yr.	106	15	83	25–25–20	Greatly improved. Well 1 yr. later, wt. 132.
16	F	22	2 yrs.	88	11	26	20–15–15	Much improved.
17	F	31	15 yrs.	120	12	30	25–20–20	Improved every way. Wt. 6 wks. later 136.
18	F	53	1.5	125	5	13	25–25–20	Some improvement.
19	F	40	1.5	109	19	30	25–25–20	Marked improvement on ambulatory treat.
20	M	20	2 yrs.	119	6	23	30–30–25	Little improvement. Better later.
21	F	20	5 yrs.	86	7.5	21	25–25–20	Marked improvement.
22	F	28	5 yrs.	102	16	41	30–30–25	Marked improvement.
23	F	53	10 yrs.	74	15.5	36	30–25–20	Improved but weak. 5 mos. later wt. fell to 81
24	F	36	6 mos.	102	1	43	30–25–25	Psychoneurosis. Improvement hindered by operation on tooth.
25	F	37	1 yr.	100	10	24	25–20–25	Marked improvement. Insulin continued at home. Wt. 1 mo. later, 115.
26	F	40	6 mos.	90	22	52	30–25–25	Marked improvement. No gain 3 mos. prev.
27	F	32	6 mos.	111	8	10	30–25–25	Definitely better.
28	F	21	6 mos.	110	14	21	20–20–20	Much improved. Ambulatory treatment.
29	F	67	2 yrs.	95	31	67	30–25–20	Very marked improvement.
30 (23)	F	54	10 yrs.	69	16	47	25–20–20	More marked improvement than 1 yr. prev. (23).
31	F	50	8 yrs.	99	19	40	20–20–20	Definite improvement.
32	F	27	4 yrs.	95	22	50	25–25–25	Excellent results. Ambulatory treatment.

carbohydrates and fats. The rationale of the treatment is carefully explained to the patients so that they may coöperate in preventing the occurrence of insulin reactions. A very detailed explanation is given as to how hypoglycemic reactions may result from an insufficient amount of food taken. The symptoms of a reaction are described to them in detail as a sense of restlessness, anxiety, blurring of the vision, palpitation, sweating, hot flushes, a stiffening and numbness of the tongue and lips, tremors, chills, diplopia, weakness in the legs. It is always carefully emphasized that none of these symptoms prove serious, and that they are entirely avoidable through the ingestion of sufficient amounts of nourishment. During the course of treatment they are ordered to have within reach constantly some form of concentrated carbohydrate such as sugar, candy, sweet chocolate or sweetened orange juice. They are instructed to take some of this at the slightest suggestion of the onset of any of the above mentioned symptoms. In the hospital a glass of orange juice sweetened with about six teaspoons of sugar is usually placed at the bedside every morning before the first injection of insulin and is kept there unless needed during the day until bedtime, when they are advised to drink it. As aforementioned, the diet consists mainly of carbohydrates and fats and contains large amounts of such foods as cereals, cream, butter, fat meat, bacon, potatoes with gravy, bread, malted milk and milk enriched with cream. Whenever possible a small bar of sweet chocolate is taken at the end of the meal.

The insulin is injected from twenty to thirty minutes before each meal. The first injection is five units three times a day with subsequent increase of one to two units three times a day until twenty or at times twenty-five units three times a day is given. In a few selected cases as much as thirty-five units three times a day is administered often without any hypoglycemic reactions. One must constantly be on the lookout not to inject a large dose of insulin when the patient is indisposed to eat the usual meal or is suffering from nausea and vomiting. If there is no vomiting the insulin can always be buffered by sufficient amounts of well sweetened orange juice by mouth. In cases of vomiting as much as 250 c.c. of 20 per cent glucose may be given intravenously and this will promptly obviate any hypoglycemic manifestations. I have never had to resort to this emergency measure.

In conjunction with the use of insulin I always prescribe a bitter tonic containing a large dose of nux vomica and also bitter cascara when necessary for the bowels. Since many of these patients are neurotic I administer a sedative mixture after meals and at bedtime. Proper relaxation is an essential part of the treatment. The patients are exhorted to be calm and cheerful and it is made clear to them that their being so greatly facilitates the gaining in weight.

Results of Treatment.—Chart I shows a résumé of the results obtained in the treatment of a series of thirty-two patients. In this group all but two were females and all but one were over twenty years old. Twelve patients were between twenty and twenty-nine, eight between thirty and thirty-nine, three between forty and forty-nine, four between fifty and fifty-nine, four between sixty and seventy. The average dosage administered was seventy units daily, in a few cases from eighty to ninety units were used. I have found that some patients will respond to large doses only, and in general the larger doses bring about the more rapid improvement. In the literature some observers have obtained good results with only thirty units daily. I have always found that the improvement increases with the increase in the dosage, of course always within physiological limits. Four of the thirty-two patients showed no improvement for obvious reasons and in four others the improvement was only slight. In Case 3 there was no coöperation from the patient and the treatment had to be discontinued. In Case 7 there was at first some improvement but severe migraine headaches interfered with further progress. Cases 8 and 9 were old women suffering from severe melancholia, the latter had to be tube-fed during her entire stay in the hospital. Case 11 was an unfortunate case of a despondent girl suffering from the effect of pronounced scoliosis which had resulted from a severe attack of infantile paralysis. She developed a severe case of self-pity and could not be made to coöperate. Case 24 began to improve but an operation performed on an impacted tooth brought on a severe depression that impeded further progress. The twenty-four remaining patients showed a very definite improvement so that 75 per cent of this series improved physically and mentally and in a rela-

tively short period of time. Nineteen of these twenty-four patients gained more than ten pounds in weight during short courses of treatment and many of them continued to gain after the insulin injections were stopped. The greatest gain was in Case 29 where the patient increased thirty-one pounds in sixty-seven days. A woman sixty-eight years old (Case 5) was sent in with a diagnosis of a terminal state of malignancy, she was extremely emaciated, completely exhausted and had been bedridden for some time. Since no organic lesions were demonstrated by careful examination she was placed on the insulin regimen on which she gained nineteen pounds in thirty-nine days. When seen one year later she weighed 136 pounds, a total gain of thirty-seven pounds, and six years later, that is, April 24, 1933, she was in excellent health and spirits and weighed 145 pounds, a gain of forty-six pounds over her original weight. Case 19 is a nun who had been treated for a year with rest and forced feeding and a change of environment with practically no improvement. Her weight ranged between 103 and 109 pounds. When she returned to work as an x-ray technician in a hospital she still felt tired and exhausted. She was now placed on the ambulatory management with insulin. Within a month she gained nineteen pounds and she has retained practically all her weight and the sense of well being during the past four years. Several patients have found that they either have to use insulin continuously or repeat the course of treatment occasionally in order to retain their weight and strength and keep in condition to continue with their work. Some of the patients experience a general tonic effect which is often greater than would be indicated by the gain in weight alone. Cases 13 and 14 are twin sisters who suffered from chronic under-nourishment. Both were placed on the same routine management at the same time and both responded equally well, almost identically. Case 28 is a nurse who felt tired and rundown most of the time. She gained fourteen pounds in twenty-one days under the ambulatory treatment. She continued to gain in weight and in general well-being, and when last seen, on May 10, 1933, two years after treatment, she weighed 130 pounds and was feeling perfectly well. Case 32 is a teacher who had tried different methods for gaining in weight without success until she was placed on the insulin ambulatory management. Within a relatively short period of time she gained twenty-two pounds in weight and felt better and stronger than she had felt for many years.

The main symptoms complained of by this group of patients were weakness, depression, frequent crying spells, nervousness, trembling, palpitation, insomnia, at times nausea, vomiting and diarrhea, and always an inability to gain in weight. Following treatment the patients seem to acquire a greater sense of well-being, a more cheerful outlook on life, an improved disposition and in a general way they appear better. In some cases unfortunately the improvement is only temporary but in a large number it seems to be quite permanent.

Mechanism of Effect.—The general improvement in most of the patients treated, psychological as well as physical, shows that there is a profound constitutional effect produced by the administration of insulin. Many explanations are offered for the beneficial effect, especially for the increase in appetite and the resultant gain in weight. Quigley and Carlson have shown that there is a rise in the gastric tonus with repeated rapid contractions and prolonged hunger contractions as a result of the injections of insulin. In some patients there develops a ravishing appetite, Falta's "Heiszhunger." It has been shown that the insulin hypoglycemia produces a stimulation of the secretory centers of the pancreas, stomach and biliary system. There is an improvement in the carbohydrate metabolism as well as in the general metabolism with increased digestion, absorption and assimilation of the food ingested. There is probably also a greater permeability of the tissue cells for sugar with increased oxidation and greater glycogen deposit, as well as some increase in cellular water retention. The increase in hunger from the prolonged hunger contractions of the stomach together with the increase in the secretion of the gastrointestinal juices and the increased secretion from the biliary system as well as the better utilization of the carbohydrates and fats through the direct specific action of the insulin, help to explain the favorable results in the insulin treatment of undernourishment.

PREVENTION OF UNDERNOURISHMENT

It may not be amiss at this time to say a few words in regard to the prevention of certain

forms of undernourishment. There is a form of malnutrition which is induced by too restricted diet and for too long periods of time in the treatment of various ailments. The seriousness of such malnutrition is too often overlooked by many doctors. In addition to the nourishment resulting from such dietary restrictions there is often associated certain forms of avitaminoses which in themselves are responsible for serious disease states. Usually the average American diet is adequate to prevent the development of deficiency diseases but the restricted diets are often lacking in sufficient amounts of certain vitamins. In a personal communication to me Dr. Walter Alvarez stated that most of the patients he has seen with symptoms of avitaminosis had been suffering from too restricted diets imposed by doctors for too long periods of time in the treatment of certain diseases like nephritis, ulcer, hypertension, et cetera.

Many doctors still impose stringent low protein diets in the treatment of hypertention, eliminating meats, fish, cheese, eggs and other protein foods. Careful observations have established the fact that there is no rational basis for such restriction. A moderate amount of protein food has been found to have no unfavorable effect on the blood pressure.

In the treatment of chronic peptic ulcer and especially chronic ulcerative colitis, undernourishment and deficiency states have been developed from too limited diets. In diarrheas, especially, the nourishment is interfered with by the improper absorption and elimination of the food ingested. Xerophthalmia and less easily recognized deficiency states may often result. It might be well to recall Brown's[6] suggestion that "far more harm is done by diets too limited than by one too free."

Another group of patients that often suffers from too strenuously restricted diet is that of chronic Bright's disease. It is too generally assumed that whenever albuminuria is present the patient has to be placed on a rigid protein restricted diet. This is quite improper management since it has been found that the protein restriction need be little or not at all unless there is already definite evidence of renal insufficiency with beginning accumulation of metabolities in the blood. Indeed, certain types of Bright's disease which have a strong nephrotic element are often benefited by high protein diets. It is also to be noted that the kind of protein used whether from red meat, white meat or from other sources, is absolutely of no importance. Anemias as well as undernourishment may result early from too rigid dietary restrictions.

The same holds true in the albuminurias of congestive heart failure. Here also no dietary restrictions are necessary other than the restriction of salt and water for the prevention of edema, and the avoidance of too large or heavy meals at one time so as not to embarrass the heart's action. No protein restriction is necessary.

Dietary restrictions for obesity are often too drastic. Deficiency states involving severe exhaustion and nervousness occasionally follow. In some patients the losing in weight continues after the desired stage has been reached, often associated with increasing nervousness. It is usually advisable to give brewer's yeast, cod liver oil, fruits and vegetables in large amounts to compensate for the restriction of food necessary to lower the calory intake. In diseases of the joints various fads of dietary management have been used which may lead to undernourishment of the patient. It is now generally agreed that the full caloric anti-constipation diet, with the addition of some vitamines, is best in all cases of chronic infectious arthritis where there is no marked overweight.

There is usually altogether too great restriction of diet in post-operative cases where there has been found some associated condition as a mild nephritis, hypertension, heart condition or moderate grade of albuminuria from whatever cause. Unless there be some definite surgical indication for the restricted diet the choice of food as far as the associated condition is concerned may be very liberal. There is little danger, as a rule, of a recent postoperative patient overeating any certain kind of food. Restriction in protein is very seldom necessary. The patient should be allowed considerable freedom of choice since it is necessary usually to cater to the whimsical appetite of the postoperative patient.

In addition, may I say that not only should the treatment be directed so as to avoid as much as possible, disturbances of malnutrition, but that as a general rule no undue restrictions or hardships should be placed on patients, and under all

circumstances the regimen should approach the normal as nearly as possible.

SUMMARY AND CONCLUSIONS

1. Insulin is a valuable aid in the treatment of undernourishment, both diabetic and nondiabetic. Its life-saving usefulness in diabetes is well known to all.

2. Undernourishment of various degrees and often of unknown origin is frequently encountered by all practitioners of medicine. Patients affected by such undernourishment frequently present a group of symptoms which seem to be directly related to the undernourished state. Improvement in nourishment usually promotes the general well-being of the patient.

3. Many undernourished patients who do not respond to the usual management of rest, tonic, and high caloric diet, will show definite improvement after the addition of insulin. The beneficial results are obtained more rapidly.

4. In addition to the specific and indirect effects of insulin on appetite and metabolism, the fear of insulin reactions hangs over the heads of the patients like the sword of Damocles, inducing them to ingest much more food.

5. The insulin fattening cure is simple to carry out if properly understood. Careless administration without proper attention to the balancing of the diet, may of course, lead to uncomfortable reactions. The results from the ambulatory method seem to be just as good as in the hospitalized cases. This makes this method especially valuable, since more patients may enjoy its benefits.

6. The easy accessibility to carbohydrates such as sugar, candy, or sweet drinks during the course of treatment is very essential.

7. In the series of thirty-two cases treated with insulin, here reported, there was a satisfactory improvement in 75 per cent of the cases. In most of the cases the improvement was more rapid and more pronounced than that obtained with non-insulin methods.

8. More attention should be paid to the danger of too rigid dietary restrictions in the treatment of various ailments, especially those where diet is thought to be an important factor. Many cases of undernourishment and deficiency states result from too drastic diets continued over too long periods of time.

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VITAMIN DEFICIENCY IN CHILDHOOD*

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IN this symposium the part played by vitamins in nutrition and the various manifestations of vitamin deficiency already have been reviewed. There remain to be discussed, in this presentation, certain applications of our present knowledge of the vitamins as it concerns children. To this end the subject is best approached by considering the vitamins individually.

The pathological picture produced by vitamin A deficiency includes changes in the epithelium of the nose and throat which make these areas more susceptible to secondary invasion by bacteria. Thus, vitamin A deficiency can become a predisposing cause of upper respiratory infection and sinus disease. When a patient comes under care with a history of frequently recurring upper respiratory infection, it is desirable to be certain that a sufficient amount of vitamin A is being ingested. In order to attain this certainty, often cod liver oil is prescribed. At the same time one should not be too greatly disappointed if this therapy fails to accomplish a decrease in the amount or frequency of infection. Upper respiratory infections occur from other causes than vitamin A deficiency. This is especially true of such specific infections as the common cold. Few would expect to create a specific immunity by nutritional means. Yet our current literature contains a number of reports of failure to reduce the frequency of the common cold by cod liver oil administration, and these reports carry the inference, at least, that vitamin A is of little value as an anti-infective agent. It is desirable to recognize the fact that vitamin A deficiency may lead to respiratory infections, but at the same time it is necessary to keep oriented to the extent that we do not deprecate the usefulness of vitamin A because it fails us in instances in which we really should not have expected success.

Vitamin A deficiency of sufficient degree to produce the well known and outspoken symptoms characteristic of this deficiency is rare in this country. We have no good idea of the prevalence of a moderate deficiency of this vitamin. In searching for a clinical measure of moderate vitamin A deficiency it occurred to us that night blindness might serve such a purpose. By means of a photometer we have determined the speed of recovery of acuity of vision after exposure to a bright light. We have found that approximately 20 per cent of the children applying to our children's hospital for treatment have a loss of visual acuity in the dark, and that the acuity of vision can be restored by cod liver oil administration. We believe that we have established the validity of this procedure as a method of deter-

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mining vitamin A deficiency. We would attach no special significance to the incidence figures we have obtained up to now, except possibly that they permit us to state that in this particular class of children, moderate deficiency of vitamin A is relatively common. From this finding we would not draw the inference that vitamin A concentrates are indicated routinely in the everyday feeding of children. It is our opinion that a good diet will supply an adequate amount of vitamin A, and that, ordinarily, the use of a good diet is the better method of obtaining this vitamin.

Animal experiments in our own clinic and elsewhere have shown that ingested mineral oil carries away, in the feces, some of the vitamin A of the food. When the amount of vitamin A permitted to the animals is only sufficient to meet the minimal requirements for growth, the addition of mineral oil to the diet in amounts proportionate to the usual human dose causes the animals to die with signs and symptoms of vitamin A deficiency. When the animal receives larger amounts of vitamin A, mineral oil does not have this effect. We encounter few opportunities to determine the application of this experimental finding to the human. Recently, a child with loss of visual acuity in the dark failed to recover normal acuity of vision after the administration of cod liver oil for several months. She had been taking a generous dose of mineral oil daily. Her vision became normal very soon after the administration of mineral oil was discontinued. It seems entirely possible that ingestion of mineral oil may be a contributing factor in vitamin A deficiency in the human.

In discussing vitamin B, I shall include those factors which make up what is known as vitamin B complex. Vitamin B preparations are extensively advertised. The question arises as to the general need for such preparations and as to the prevalence of vitamin B deficiency. The prevalence of this disorder is difficult to determine. We have no definite measure of moderate degrees of vitamin B deficiency. As judged by the content of the average American diet, vitamin B may readily be moderately deficient in the diet of a considerable number of people. The published reports of clinical observations are not conclusive in this respect. The improvement reported in some of the feeding experiments may have been due to factors other than the vitamin B content of the dietary additions. It is definite that vitamin B deficiency causes loss of appetite. However, if vitamin B addition to the diet is the only change made in the regime of the child with poor appetite, the chances are great that no improvement in the appetite will be noted. Poor appetite in the child is dependent upon psychic factors and feeding habits in a high proportion of cases. If vitamin B deficiency is present in addition, it is difficult to detect. It is true, also, that vitamin B deficiency causes atonic changes in the intestinal tract which may lead to constipation. Despite this fact, one rarely encounters a child whose constipation is relieved by the addition of vitamin B to the diet. In evaluating this statement it is necessary to realize that wheat germ preparations have laxative effects which are entirely independent of their vitamin B content. The relief of constipation by wheat germ is not evidence of a preceding vitamin B deficiency, despite many advertising inferences to the contrary. Whether or not a moderate degree of vitamin B deficiency is common, it seems definite and well established that a good, well balanced diet of common, natural foods supplies an adequate amount of vitamin B for growth and health, and, consequently, no need exists for special vitamin B preparations for everyday use by the normal individual when proper thought is given to the diet. In so far as this contention can be demonstrated by the usual clinical means, it has been shown in groups of infants and children which we have had under special nutritional observation. These individuals have grown at a rate considerably exceeding the average, have had excellent appetite and robust health, and have been lacking in all of the symptoms which are attributed to vitamin B deficiency; yet they received only a good diet with no special vitamin B preparation.

Scurvy, developed to the extent that it is recognized, has become a rare disease in this country. In our practice we almost never see a case at the present time. A statement that vitamin C deficiency is uncommon is easily credible. Yet we have no accurate knowledge of the extent of moderate and unrecognized degrees of such a deficiency. Göthlin, by means of a tourniquet-capillary permeability test has found subclinical vitamin C deficiency to be relatively common among the children of northern Sweden during the winter season. Such a finding would not

necessarily hold for this country, yet we have no secure basis for optimism in this respect. It is entirely possible, were a delicate test applied, that a wholly unsuspected incidence of this condition would be found. However, any apprehensions in this respect would be put quickly at rest by the application of a more wide-spread knowledge of what should constitute a normal diet. In considering the requirements of a normal diet, the inclusion of such recommended quantities of orange juice as a quart a day seems ridiculous.

Of all of the known vitamins, vitamin D is the one of which we have most reason to fear a common deficiency. This fact is so generally known that it has become common practice to include some good source of vitamin D in the diet, especially at the age when the clinical effects of a deficiency are so obviously manifest. Though rickets is far less common than formerly, it is still to be observed with much too great a frequency. By inference it would seem that Nature intended that we obtain much of our vitamin D through the medium of sunshine; the distribution in our common foods is relatively meager. The practice of intentionally including in the diet some special source of vitamin D is an excellent one. In infancy such a practice serves to prevent rickets, while in the older child it serves as an additional safeguard in meeting an unknown requirement with a sparse content in the food.

Rickets in infancy probably is not as frequent as some of the statistical reports might lead us to believe. Reports, which state that approximately 80 per cent or more of the babies in the temperate zone have rickets in spite of cod liver oil therapy, are based upon Roentgen-ray studies. Roentgenologic criteria for the diagnosis of mild rickets need revision. This statement is based in part on a study of a carefully observed and closely supervised group of babies which we have had under observation. These babies received an abundance of food, with the result that they grew at a rate more rapid than the accepted standards. The increased growth was in height as well as in weight. That the increased growth was of good quality was attested by the large daily retentions of nitrogen, calcium and phosphorus, and by the physical vigor of the infants. Roentgenograms were taken at monthly intervals. These were reviewed by expert roentgenologists in two different localities. These men were in agreement in the opinion that at some stage in their development practically all of the babies presented evidences of rickets according to current criteria. Our belief that these babies did not have rickets is based upon facts which seem sufficiently significant.

A good indication that the roentgenograms did not show very definite evidences of rickets is that they were classed as negative for rickets by an orthopedic surgeon well accustomed to the interpretation of bone roentgenograms, and also by an internationally known anthropologist who has studied such pictures for many years. In these babies growth and calcification were taking place at an unusual rate. The increased rate of calcification was demonstrated by the appearance of carpal bone shadows in the roentgenograms considerably in advance of the expected or average age. In rickets one expects a decreased rate of calcification. The retentions of calcium and phosphorus were greatly in excess of the accepted average standards, whereas in rickets a decreased retention is expected. At all times the blood calcium and phosphorus were found to be at high normal levels. Finally, some of these infants were diagnosed as having rickets in middle and late summer, despite the fact that the babies had spent much of the day time out of doors. In view of all of these considerations we believe that such changes as were observed in the bones of this group of babies were entirely normal for rapidly growing bone. It is on the basis of such reasoning that we question the reported high incidence of rickets among babies who are receiving good nutritional supervision. The reported incidence of rickets, therefore, does not serve as an index of the prevalence of vitamin D deficiency.

It is of interest, also, that the babies just discussed received routinely only one teaspoonful of cod liver oil daily in addition to their regular diet which contained no other special source of vitamin D. If it may be granted that the babies did not have rickets, then it may be concluded that one teaspoonful of cod liver oil daily is sufficient to prevent rickets in the locality in which these observations were made (Iowa). This finding is not necessarily a contradiction to the recommendation of three teaspoonfuls of cod liver oil daily made by the Council on Pharmacy and Chemistry of the American Medical Association,

for the reason that this group, in expressing an official opinion desired to recommend a dose ample for the least favorable localities.

In dental caries we have a disease which has been proved to be dependent upon nutritional deficiency. The wide prevalence of this disorder seems an excellent index of the great extent of some type of nutritional deficiency in our population. Various observers have selected and emphasized some one or more of several different dietary factors as being of primary importance in the control of tooth decay. It is our belief that there is no single specific deficiency responsible for tooth decay, and that the individual nutritional factors should not receive undue emphasis. We should not design a diet specifically for the prevention or arrest of dental caries. Rather, it would seem preferable to prescribe a "complete" diet, which, because of its completeness, would not only accomplish our aims in regard to dental health, but at the same time would satisfy all of the many nutritional requirements. Even though we have this attitude in regard to the nutritional essentials responsible for dental health, we are quite ready to admit that vitamin D is one of the important factors. Mellanby has observed arrest of dental caries in some of a group of children when administration of viosterol was the only change made in the children's care. To what extent a deficiency of vitamin D is the chief or even an important factor in tooth decay among children in general we have no knowledge. In the present state of our knowledge it would seem preferable to insure an adequate supply of this material.

For obtaining vitamin D in addition to that found naturally in our food we have available an unusual number of methods. These include direct irradiation of the body with ultraviolet energy and the administration of cod liver oil and its concentrates and the administration of viosterol. They include also the use of foods which have been irradiated or to which vitamin D in some special form has been added directly or indirectly. By indirect addition I refer to the feeding of irradiated foods to the cow for the purpose of increasing the vitamin D content of the milk. The choice among these various methods is not easy and each may be employed advantageously, at times, for some special indication.

Despite this multiplicity of means for supplying vitamin D, we find vitamin D deficiency still rather widely prevalent. This is good evidence of a lack of application of such knowledge as we have, and is an indication that we should encourage some prophylactic measure that has a wide applicability and which requires little initiative on the part of the consumer. The increase of vitamin D in foods before distribution either by irradiation or by the addition of concentrates would seem a satisfactory answer to this problem. The iodine deficiency problem is partially met in a similar manner by the addition of iodine to salt. In making any such widespread prophylactic attempt, a decision must be made as to what food shall be the vehicle and as to what methods shall be used in enhancing the vitamin D value of those foods. This problem is not a simple one. The irradiation of a large number or variety of foods should not be permitted nor approved. Such a procedure would lead to too great a variation in dosage for the individual, with the possibility that certain individuals would be ingesting an excessive and, possibly, a harmful quantity. The indications are that we may now be headed in the direction of such a chaotic state.

Some food, which is universally used, should be employed as the medium for this dietary addition. Such a food is milk. Milk is the basic food in the diet of every infant, and it is the artificially fed baby who is most likely to develop rickets. Milk should be considered an essential inclusion in the diet of every growing child. If a suitable amount of vitamin D were added to all milk distributed by commercial dairies, a great amount of benefit would be obtained in the direction of general prophylaxis against vitamin D deficiency, even though such a method is not readily applicable to rural districts. This method of prophylaxis is relatively inexpensive and it is automatic; both of these are advantageous features.

Milk is an excellent medium for additional amounts of vitamin D not only because of its universal use, but also because it is our one best source of calcium and phosphorus. Other foods, as compared to milk, are relatively lacking in these essential minerals, especially in calcium. Vitamin D is concerned with the utilization of calcium and phosphorus and all three of these materials would be associated in vitamin D fortified milk.

Before we know exactly what we are doing

in the fortification of milk with vitamin D, much clinical research is necessary. Apparently the present methods of measuring the vitamin D content of foods in terms of rat units do not give us the type of information we need. According to the observations of A. Hess, equivalent antiricketic effects in the child are produced by 1 rat unit of vitamin D in irradiated milk, 4 units in cod liver oil and 8 units in viosterol. A statement of the vitamin D content of various antiricketic substances in terms of rat units is likely to give a false impression as to their antiricketic value for the infant. Apparently 50 rat units daily of vitamin D as contained in irradiated milk will prevent and cure rickets readily. In rat unitage this quantity is equivalent to one half teaspoonful daily of a high grade cod liver oil. In order to know the relative effects of different methods of milk fortification, and from this the amount of fortification desirable, it is necessary to be able to measure the vitamin D content of foods in terms of child units, rather than in rat units. Such information as we now have indicates that relatively small amounts of vitamin D, as contained in irradiated milk, are highly efficient as an antiricketic agent and, probably, as a consequence, little fear need be entertained concerning the danger of overdosage and harmful effects when the use of this procedure is properly controlled.

Vitamin E we shall mention only in passing. It would seem that this essential food material is so widely and generously distributed in foods that we scarcely need concern ourselves about its possible deficiency in the diet.

In this discussion, has been stressed the opinion that for routine management of the diet of children no indication exists for the use of special vitamin preparations, with the possible exception of preparations of vitamin D. It has been stated that we can obtain all of these nutritional essentials from common natural foods, and this should be the preferred method. A well-chosen diet of natural foods is nutritionally superior to a diet composed of concentrates. One very good reason why this is true is that, in all probability, essential nutritional factors exist which are still unknown to us. Evidence is developing that some nutritional factor particularly useful for growth and lactation is present in liver and that this factor is not any of the present known essentials. Other substances also will be included among the human requirements as our knowledge of nutrition increases. All of these are more likely to be included in a good mixed diet than in a diet of concentrates.

Nearly thirty years ago Hopkins pointed out this same general truth as follows: "The animal body is adjusted to live either upon plant tissues or the tissues of other animals, and these contain countless substances other than the proteins, carbohydrates and fats. Physiological evolution, I believe, has made some of these wellnigh as essential as are the basal constituents of the diet. . . . . it is certain that there are many minor factors in all diets of which the body takes account. . . . . I can do no more than hint at these matters, but I can assert that later developments of the science of dietetics will deal with factors highly complex and at present unknown."

In condemning concentrates for routine use, I may have conveyed the impression that I believe the average diet to be satisfactory as it is now constituted. I desire to correct any such impression. The evidence is abundant that the average diet at all economic levels is deficient. Excellent evidence for this lies in the prevalence of dental caries, which already has been discussed. When a disease, which is dependent upon nutritional deficiency, is found in 80 to 90 per cent of our children, the conclusion is obvious that the average person has little conception of what constitutes an adequate diet and that our present dietary habits are far from satisfactory.

DISCUSSION ON PAPERS OF DRS. G. O. BURR, S. E. SWEITZER, HARRY OERTING, AND MOSES BARRON

Dr. W. C. Alvarez (Rochester): I feel a bit like the minister who was aked to discuss the immortality of the soul in five minutes. It is hard to sum up all this splendid symposium in ten minutes. I think you will agree with me that all of the speakers have been eminently sane, judicial and helpful. That is just what those of us who planned this meeting wanted. We hoped the speakers would sift out from the enormous amount of information obtained from work on rats, that which should be useful to us practicing physicians. We want to know how much we need to worry about these vitamins, when we must worry, and what symptoms we must watch for.

I concur heartily in what the speakers have said, and I have been delighted with their papers. I think they have all steered wisely between the Scylla of lack of interest in the remarkable work which has been done on animals in the last twenty. or thirty years, and the Charybdis of being stampeded into foolish behavior, particularly by the literature of men who have something to sell.

Unfortunately, today the layman must get most of his impressions on this subject from men who are spending millions on full page advertisements in the *Saturday Evening Post* and other journals. These men will, of course, quote any scripture they can find to serve their purposc, which is to frighten people into buying their particular "health food." One cannot help wishing that these tremendously expensive and powerful campaigns of education might be directed by more judicious teachers.

Let me now summarize brifly the questions that have interested us most this morning.

First: How much of that which is being learned from experiments on rats is applicable to man, and particularly, to adult man?

As Dr Burr pointed out, vitamins are producers of growth, and hence wc have to be most careful to supply them to the growing child, the pregnant woman, and the nursing mother. They who are building something must be supplied with all of the building blocks that are necessary to growth, and if we do not supply them every week they may gct into trouble. I, an adult, am built. All I need is the fuel to keep me going and a certain small amount of nitrogen with which to repair the daily damage done to my tissues. If necessary, I can go for weeks and perhaps months without vitamins.

Second. How much of the several vitamins must children and adults get every day to remain in health? What are the basic requirements? I am glad that Dr. Jeans has givcn us some answer to this question. I feel sure that today many worried and well intentioned mothers must be giving their children a far greater dosage of vitamins than is necessary.

We need to know also if it does any good to stuff a child with far more vitamins than are necessary. May not enough be as good or better than a feast? May we not also injure our children by stuffing them with big doses of thesc exceedingly powerful substances? I have been somcwhat reassured by noting that the dosages of Vitamin D that produce arteriosclerosis and death in animals are very large, but I have become worried again over the published reports of children dying with signs of injury due to an excessive intake of Vitamin D.

Next, what are the earliest signs of disease due to avitaminosis? Again, Dr. Jeans has helped us by showing that tests are now being designed which will help in demonstrating latent disease of this type.

Some of you who use high vitamin diets in many conditions may think, when your patients get better, that you must have treated an avitaminosis and cured it. But may you not have helped more by improving the general state of nutrition? It will take a long time and a great deal of good clinical observation before we know how much of the disease that we now seem to help with a high vitamin diet is really caused by lack of vitamins.

Another big problem is: How essential is it to supply some of the vitamins to adults? For instance, is Vitamin D at all necessary to adults and especially to an adult who lives on a generous diet and who gets out in the sun? Recent studies by Hess seem now to have knocked out what few props there were under all the ballyhoo about vitamins being necessary to protect us from respiratory infections.

We have been given here today some idea of how common or how rare avitaminosis is in the practice of American physicians. Most of the speakers who have studied the conditions here in Minnesota have told you that except for rickets, such diseases appear to be very rare. Rickets, of course, is a disease of children. Occasionally we see osteoporosis in adults but as yet we do not know what relation this has to a lack of vitamins.

It was very interesting to me some time ago to see in one or two journals, an offer by one of the companies that make vitamin concentrates, to give $10,000 to any man who will show that Vitamin D is of any value in the case of adults. I think such an offer supplies eloquent proof of the fact that we are still in ignorance on this point.

I rejoice that we have becn given some answer here today to that important question: Do the man and his wife and his children who eat enough of many foods and who are well nourished, have to be worrying about the addition of concentrated vitamins to their diet? I think Dr. Jeans is right when he says that except perhaps for seeing that the children have some Vitamin D, especially in winter, we do not have to worry.

Some people are certainly overdoing this vitamin business. I saw a woman the other day here in the Clinic who was taking, if I remember correctly, a quart of orange juice a day. Her dentist assured her that in this way she could cure her pyorrhea. She had been on this diet for several months but all it did was to produce a number of queer symptoms and some indigestion.

Unfortunately for those of us who would like to see our hospitalized patients or the patients recovering from a serious operation on the stomach get an easily digestible diet, the dietitians are usually so fearful that their patients will succumb to avitaminosis that the trays arc covered each day with spinach and salads and fruit. Most of the dietitians I have met have acted each day as if the devils of avitaminosis were right on their heels, or as if their patients were but one jump ahead of an ambulance or a hcarse. Actually, we know they are not in so precarious a state. In the old days, when a sailing ship took months to go around the Horn, the sailors who lived on salt pork and flour went wecks and months before they began to develop signs of scurvy.

There is another important thing we must remember in our practice of dietetics, and this is that in order to supply vitamins we do not have to fill the patient with indigestible roughage. I feel strongly that in prescribing diets we should think more about digestibility and less about the danger of the patient's dying with avitaminosis. If we want to give vitamins alone, we can give them in a concentrated form.

My time is almost up and there is just one more thought I would like to leave with you. What are vitamins? For the most part they are stimulators of growth in the infant and child. Well then, are not we

physicians and all pediatricians and all intelligent, college-bred mothers acting as if the most important thing on earth was to make the children grow as much as possible? And are we not doing this aimlessly and thoughtlessly and sometimes to the injury of the child? It may be all right to stuff children of small, short-statured parents with growth hormones, but is there any sense in doing this to the children of parents who are taller and heavier than the average? Do we want to make a boy so tall that he cannot fit into any bed or any theater seat or any Pullman berth? Do we want to make a girl so huge or so tall that her chances of marrying are greatly diminished?

As you all know, every generation in America is getting taller. My father is about five feet five inches and my mother was five feet six inches tall. I have a brother who is six feet one inch like me; another brother was five feet ten inches; one sister is perhaps five feet nine and one-half, and another is about five feet nine inches tall. Now, one of my boys is six feet two inches tall and one of my daughters is so tall that she had difficulty in getting dancing partners to suit her. She felt sometimes like suing me for damages for feeding her so well when she was a child. Now she has a husband six feet five inches tall and God knows how tall their children will be!

Similarly, I know two young people who are both much larger and heavier than the average run of humanity. Every day they cram their little girl with all the vitamins and cod liver oil and food that they can induce her to take. Even without such efforts the child might easily grow into an unpleasantly large woman, so why should that otherwise very intelligent mother be struggling daily to produce a baby whale? Obviously this phase of the subject has never occurred to her. Actually, the time may soon come when large people will go to physicians to find out how they can keep their girls from growing too tall and too big.

OBSERVATIONS ON THE DEEP Q WAVE IN LEAD III OF THE ELECTROCARDIOGRAM*

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RECENT electrocardiographic literature has called attention to the probable significance of a deep Q_3 wave in the diagnosis of myocardial disease. Investigators of the electrocardiogram in coronary occlusion have demonstrated the comparative frequency of this finding in their records without calling notable attention to it. Thus Parkinson and Bedford[7] noted a deep Q_3 in nine of twenty-eight cases of coronary occlusion, and, in six of twelve recorded electrocardiograms demonstrating coronary occlusion changes, as recorded by Barnes and Whitten,[1] this is to be found.

However, Pardee[6] first set forth the criteria by which significant Q_3 waves were defined, and these have been accepted by those who have discussed the subject. These criteria follow: (1) the initial deflection of QRS must be downward and there must be no S wave; (2) this wave must show 25 per cent or more of the greatest excursion to be found in the QRS of any lead; (3) records must be of normal or left axis deviation; and (4) records with a notched QRS, the so-called M or W complexes, must be excluded (Fig. 1).

The rarity of a deep Q_3 wave in normals is indicated by the finding of only two in 1,103 normals by Edeiken and Wolferth,[2] both of whom had horizontally placed hearts, a condition known occasionally to produce a deep wave when marked. However, Ziskin[9] found 20 electrocardiograms of 86 with deep Q_3 waves to be in normals, which he attributed to a horizontal heart position.

The present study covers 1,819 electrocardiograms from private and public practice, 78 patients showing deep Q_3 waves (Table I), distributed as follows: 1.33 per cent of 1,204 patients in private practice, 11.1 per cent of 63 patients in private hospital practice and 9.6 per cent of 552 patients in public hospital practice. There were forty-five men and thirty-three women, varying in ages from nine to eighty-one, 73 per cent of whom were over 50 years (see Table II). This represents an incidence of 4.3 per cent in a fair cross-section of all types of practice where electrocardiography was used, comparing with 4.1 per cent of Edeiken and Wolferth,[2] 7 per cent of Pardee,[6] and .04 per cent of Willius.[8] The latter's significance is probably due to the factors influencing the 1.33 per cent in private practice in this series, namely, the taking of electrocardiograms wherever a possible heart disease was suggested, and thus naturally including a large number of normals or cardiac neuroses.

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Of the seventy-eight records only one was found in a normal individual, that in a boy of eleven years. The anginal syndrome was found in forty-one patients, of whom seven had coronary thrombosis. Hypertensive heart disease or coronary sclerosis, or both combined, was found in forty-two patients. Some of the angina pectoris patients are also included under the latter diagnoses, but in all 75.1 per cent were with definite diagnosis of degenerative cardiovascular disease. The remainder were divided as shown, the only significant group being the rheumatic heart disease with seven patients.

That many of these patients had an advanced grade of heart disease is shown by the fact that 43.6 per cent were decompensated when examined. Also of prognostic value may be the fact that twenty-three, or 29.4 per cent, died within three years, all dying of their heart disease. All of the rest of the deaths were also due to cardiac decompensation. Attention may be called to two patients with angina pectoris and coronary occlusion, both over fifty years of age, one of whom died after nine years of angina pectoris and the other of whom is living and working today. Nevertheless, these observations show that this finding is frequently found in patients with heart disease of poor prognosis.

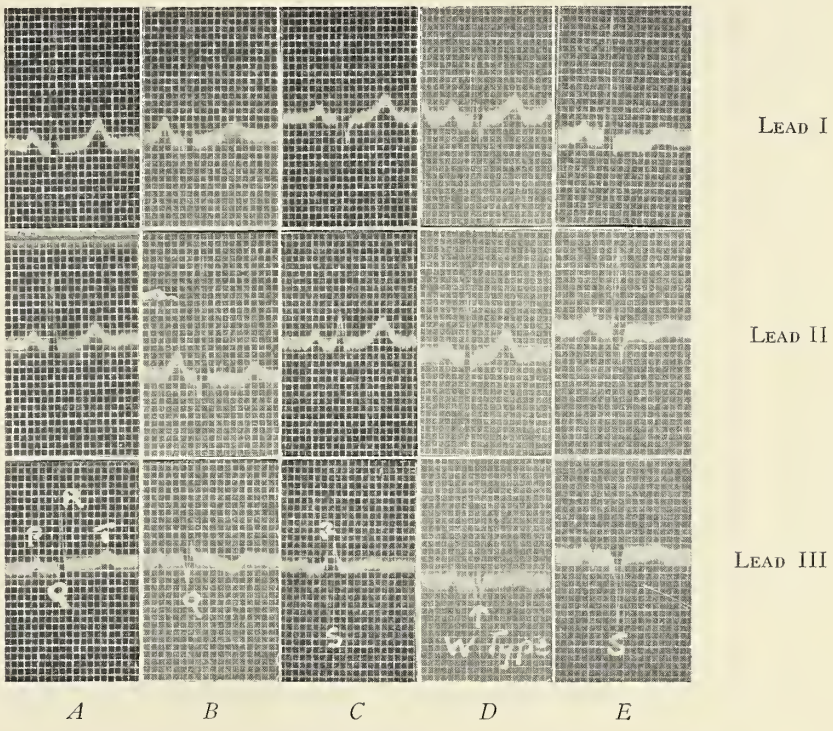


Fig. 1. *A*. A normal electrocardiogram. Very small Q wave is present in Lead I.

B. A well marked Q wave in Lead III but less than 25 per cent of the greatest QRS excursion.

C. A deep S wave in Lead III with a very short preceding R wave; not to be confused with a deep Q_3.

D. The W type of QRS complex in Lead III. This and the M shaped complexes are excluded from consideration.

E. A true deep Q in Lead III. There is no preceding upward deflection of QRS and the Q wave is practically 50 per cent of the greatest deflection of QRS in any lead.

Of especial interest is the fact that twenty-three, or 30 per cent of all the patients with heart disease, showed otherwise normal electrocardiogram, including three patients who died, one suddenly from angina pectoris, one from decompensation in hypertensive heart disease and one from arteriosclerotic heart disease with decompensation. Other authors show 45.6 per cent (Edeiken and Wolferth[2]) and 66 per cent (Willius[8]) of these patients investigated to have no other associated electrocardiographic abnormality, probably influenced by the type of patient, it being true the great majority of this series of patients had an advanced type of disease, with a

TABLE I. SUMMARY OF CASES

		Total	Private	Ward and Clinic
	Number of Cases with Deep Q_3	78	24	54
Anginal Syndrome	Angina pectoris	34	10	24
	Coronary occlusion	7	3	4
	Hypertension and (or) arteriosclerosis	42	9	33
	Rheumatic heart disease	7	0	7
	Syphilitic heart disease	1	0	1
	Hyperthyroidism	1	0	1
	Myxedema	1	0	1
	Chronic myocardial disease cause unknown	4	0	4
	Decompensated when seen	38	8	30
	Died	17	4	13
	No heart disease	1	1	0

TABLE II. AGE DISTRIBUTION

Age	Number	Per cent
10–20	3	3.9
20–30	3	3.9
30–40	4	5.2
40–50	11	14.3
50–60	20	26.
60–70	23	29.9
70–80	13	16.9

TABLE III. T WAVE NEGATIVITY—A COMPARISON

T Wave Negativity	Pardee No.	Pardee %	Willius No.	Willius %	Borg No.	Borg %
Lead I	1	2.5	28	9.3	3	3.8
Leads I and II	4	9.0	20	6.6	20	25.6
Lead II	0	0	0	0	3	3.8
Leads II and III	11	25.0	27	9.0	5	6.4
Leads I, II and III	0	0	11	3.7	7	9.0
Total	16	37.2	86	28.6	38	48.7

TABLE IV

	Total with significant Q_3 waves	Anginal Syndrome No.	Anginal Syndrome %	Hypertension and (or) arterio sclerosis without the anginal syndrome No.	Hypertension and (or) arterio sclerosis without the anginal syndrome %	Syphilitic cardio-vascular disease No.	Syphilitic cardio-vascular disease %	Rheumatic heart disease No.	Rheumatic heart disease %
Pardee; No. of cases not stated	43	27	63.0	2	4.6	1	2.32	4	9.3
Edeiken and Wolferth; 500 cardio-vascular cases	31	5	16.0	10	33.0	8	25.8	3	9.7
Willius; 70,000 electro-cardiograms	300	115	38.3	153	51.0	7	2.3	8	2.7
Borg; 1819 electro-cardiograms	78	41	52.3	42	53.8	1	1.3	7	8.9
Ziskin; 4,885 electro-cardiograms	86	12	14.0	41	48.1	0		3	3.5

higher probability of other findings. This would lead one to be suspicious of heart disease in records showing the deep Q_3 wave without other electrocardiographic abnormality. In about half of this series (48.7 per cent) there was significant T wave abnormality associated. This is given in Table III with a comparison of the findings in the series of Willius[8] and Pardee.[6] Considerable variation is seen here but probably the larger number of these findings is again due to the advanced grade of heart disease predominating in this series. Other abnormalities noted were eight electrocardiograms with delayed auriculo-ventricular conduction, seven with arborization defects of QRS, six showing an abnormally low voltage, eleven showing auricular fibrillation, 6 showing ventricular extrasystoles and seven showing the arched S-T interval characteristic of coronary occlusion. Three of the patients with this last finding have died.

A study of the relationship of the depth of the Q_3 waves to the clinical diagnosis revealed nothing significant except for a tendency for the deeper waves, the 75 to 150 per cent type, to be associated with coronary occlusion and sclerosis.

DISCUSSION

Bringing together the results of the previously reported and present series, as regards the more important conditions, it can be seen that there is a general agreement in the fact that this wave occurs chiefly in patients with degenerative cardiovascular disease (Table IV). Undoubtedly variations in the type of material used plays a

part in the varying results here found, as in the relatively high percentage of syphilitic heart disease found by Edeiken and Wolferth[2] alone. This type of disease was relatively infrequent among the patients studied in the present series. This table also shows the high percentage of anginal syndrome generally associated with this wave, although the actual figures varied. Ziskin admits a general younger age in his group than that usually associated with anginal syndromes. Possibly Edeiken and Wolferth's low figure[2] has a similar explanation on an age, sex or race basis, such information not being given. It may easily be that the criteria of the anginal syndrome (outside of coronary occlusion) may vary with different authors, and thus the consideration of all the degenerative heart disease in a single group may give a more accurate classification.

Considerable discussion of the probable mechanism of production of the deep Q_3 wave points to two probabilities: (1) involvement of the septum by cardiac disease; and (2) a change in position of the septum toward the horizontal. Lewis[4] attributes the Q wave to the septal activation, and the work of Pardee,[6] Meek and Wilson.[5] Edeiken and Wolferth[2] and Ziskin[9] point unmistakably to the rôle which a horizontally placed septum plays in the production of a deep Q_3. However, the striking results of Fenichel and Kugell[3] in the demonstration of septal myocardial damage post-mortem in patients showing the deep Q_3 cannot be ignored. It is definitely shown that the great majority of these patients have a serious myocardial disease. This is emphasized by the present series with its three year mortality of 29.4 per cent. Only further detailed necropsy study of these cases will further clarify the situation.

SUMMARY

1. Study of 1,819 electrocardiograms showed 78 presenting a significant deep Q_3 wave, occurring chiefly after 50 years of age and especially in public and private hospital practice.

2. The majority of these occurred in patients with degenerative heart disease.

3. The anginal syndrome was present in 52.3 per cent of the patients.

4. Histories of decompensation were present in 43.6 per cent of the patients.

5. Thirty-one per cent of the patients presented no other electrocardiographic abnormalities but all had otherwise proven heart disease, showing the difficulty of excluding such condition where the deep Q_3 may be found alone.

6. Death within three years occurred in 29.6 per cent of the patients whose electrocardiogram showed this finding.

7. The finding of the described deep Q_3 waves seems destined to be of considerable aid in the diagnosis of myocardial disease.

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918 LOWRY MEDICAL ARTS BUILDING

CALCIUM DEFICIENCY ASSOCIATED WITH FUNCTIONAL GASTRO-INTESTINAL DISTURBANCES IN ADULTS*

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THE purpose of this paper is to call attention to the clinical manifestations of a group of adult patients with so-called "functional dyspepsias," who show definite evidence of bone decalcification by controlled radiographic studies. In order to evaluate the importance of the symptoms, the present knowledge concerning calcium metabolism should be briefly reviewed. Much confusion has arisen because physiologists, until recently, did not recognize that the minimum chemical requirements for maintaining life and growth were not the optimum requirements for the best health and maximum efficiency. The adult may maintain calcium equilibrium on 0.4 to 0.5 gram of calcium oxide per day, but for proper reserve power and resistance requires three times that much. The average American diet, according to Lusk, Sherman and others, often does not reach this minimum requirement, unless one pint or more of milk is added to the diet, or an equivalent of cheese. One litre of milk furnishes 1.4 grams of calcium and 1 kilo of cheese 5 to 10 grams. Other foods in the dietary contain much smaller amounts of calcium. In green vegetables there is an excess of magnesium over calcium, or the deficiency of phosphorus in a vegetarian diet makes calcium less available for use by the living organism.

Calcium is necessary to the body in the following chemical states:

1. Calcium carbonate and calcium phosphate of bones.
2. As a precipitate in tissue and organs in pathological conditions.
3. As a content of all tissue influencing the excitability of the motor system.
4. Indispensible for the normal clotting of blood.
5. Saponification of fats in the intestine.

Absorption and excretion of calcium: From 65 to 75 per cent of the calcium ingested passes out in the feces while 25 to 35 per cent is excreted in the urine. Only magnesium, in the body, has the same properties as calcium. Sodium and potassium, for example, are almost entirely excreted through the kidneys. Absorption of calcium is impeded by:

1. Diarrhea.
2. Insolubility of the calcium salt ingested.
3. Decreased inorganic acid content of the stomach and small intestine, as in deficient hydrochloric acid.
4. Too large an amount of phosphate in the food as it produces insoluble calcium phosphate.
5. Poor utilization of fats and fatty acids, because fatty acids in the intestine form insoluble calcium salts.

On the other hand calcium absorption is increased by:

1. Acidosis.
2. Acid (mineral) in the intestine (normal HCl).
3. Ammonium chlorine producing systemic acidosis.
4. Probably Vitamine 'D' and violet ray (Sunlight).

According to Zucker, on a well-balanced diet containing 1.5 grams of calcium daily, the human body excreted 71 per cent in the feces, and 29 per cent in the urine, but after ingestion of 300 c.c. of 0.1 n HCl the ratio was 68 to 32. Upon giving 15 grams of Na HCO_3 the ratio was 78 to 22 per cent. The urine normally maintains the balance.

According to experimental evidence most of calcium absorption probably takes place in the small intestine. Most of the calcium absorbed is excreted by the kidneys. According to the work of Wellman on rabbits, one-fourth to one-third of endogenous calcium was excreted by the intestine, while Dadlez recovered two-thirds of intravenously injected $CaCl_2$ in the feces and one-third in the urine.

In starvation, the calcium first disappears from the urine, but even after prolonged starvation, the feces show very considerable amounts thereby producing bone decalcification.

Distribution of blood calcium: Normal blood serum contains 9 to 11.5 mg. of calcium per 100 c.c. of blood, but blood cells are almost devoid of calcium. Only in extreme metabolic disturb-

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ances does the blood serum calcium vary from normal. In the terminal months of pregnancy there is a tendency to be slightly below the average normal. Edema fluid, serous exudates and spinal fluid contain 5 to 7 mg. per 100 c.c., the amount being higher with increased protein content.

Much clinical observation has been handicapped by the impression that probably no calcium disturbances could be present as long as the total serum calcium values were undisturbed. Fortunately for the animal organism it is only in extreme difficulties that the total serum blood calcium is disturbed, although bone may be decalcified and body tissues depleted.

No doubt, calcium exists in the blood in more than one physio-chemical state, and although the question of how many forms is uncertain, the bulk of evidence (see Peters and Van Slyke) suggests the following probabilities:

1. About 20 per cent appears in solution, the same as any other soluble salts, *i.e.*, in an ionized state.

2. About 25 per cent is held in solution by the serum proteins (colloidal).

3. And about 50 per cent possibly exists in a state similar to supersaturated solutions, and is probably under the influence of the parathyroid hormone.

Relation between calcium and phosphorus: Bivalent calcium and trivalent PO_4 in the circulatory serum seem to bear a reciprocal relation to each other. With decreased calcium the phosphates increase and vice versa. Decreased serum protein is also accompanied by decreased serum calcium, such as occurs in edema. Quoting Peters and Van Slyke, "Serum calcium values cannot be interpreted unless both protein and phosphate are simultaneously determined or are known to be normal. Low calcium with low protein or high phosphate has an entirely different significance from a low calcium with normal protein and phosphate."

Does calcium deficiency occur and if so can it be recognized in ordinary clinical practice? To study a calcium-phosphorus balance, the patient must be hospitalized and accurate food, blood, urine and fecal analysis made, which requires the services of a well-trained bio-chemist. In actual practice, other methods of diagnosis must be employed as a rule. The following case of undoubted calcium deficiency will first be reported in order to keep the picture of the more extreme case in mind.

Case 1.—Mrs. I. first consulted us on May 27, 1927 when forty years of age. At this time she complained of: (1) stiffness of the body from the shoulders to just below the hips; (2) pain and soreness upon pressure over any part of the body skeleton; (3) recurrent diarrhea; (4) abrominal discomfort.

The patient was a graduate nurse who had been working off and on since her marriage six years before. The family history had no bearing on the complaint. As a baby the patient had suffered from rickets. She had a chronic appendix removed in 1910 and tonsillectomy in 1914. She had some tendency to urticaria. She had had two previous attacks of slight upper abdominal pain with cause undetermined.

The patient had had a tendency to diarrhea all her life, but in 1914 it was associated with soreness in shoulders, arms and hands which cleared up after tonsillectomy. In 1917 she had slight general soreness and shortness of breath which improved after removal of some bad teeth. Her health was then good up to the spring of 1921 just before her marriage. She first had severe diarrhea with six or eight stools per day which were very foul, sour and contained quantities of gas. Similar recurrences appeared about twice a year ever since. She was in bed six weeks in 1921, married in 1922 and then was free from symptoms for a few months, but had recurrences every spring. In 1924 during pregnancy she had no diarrhea, but had considerable digestive disturbances, and during this pregnancy the stiffness about the back and joints reappeared. She miscarried at eight months and was then better for a few months. In the spring of 1925 she had a violent attack of diarrhea which lasted six weeks. There was no fever and neither blood nor pus was noted in the stools. In February 1926, one year before she first consulted us, she had a mild attack of La Grippe which was followed by diarrhea and muscle soreness during March, April and May, and was followed by stiffness and soreness throughout the body lasting into the Fall.

The recurrent attacks of diarrhea and the "rheumatism" persisted up to the time she consulted us, but she had never had redness nor swelling of the joints, nor a fever of more than one-half a degree.

She had had no treatment, but had herself chosen a heavy vegetable and starch diet. She had had abdominal distension, more frequent stools with flatus in the latter part of the day; no vomiting, but an intensive desire for sour foods or drink. She stated she had a tendency to anemia, and in one attack the blood dropped as low as 25 per cent. Her weight had dropped from an average of slightly above 100 pounds (height 5 feet 3 inches) to 85 pounds.

Examination: The patient, upon first examination in 1927, was pale, sallow and emaciated. There was no large glands. The tongue was normal and showed no evidence of present or former glossitis. The gums were spongy and bled easily. She had had eight teeth

removed which were reported "soft." The thyroid was not enlarged, but a loud, blowing systolic murmur was present over the precordium, which was fairly well transmitted to the axilla; no signs of failing compensation. The lungs were normal. Tenderness and a sense of resistance was present over the course of the descending colon which could be rolled under the fingers. There was no pitting edema.

Upon examining the skeleton, no evidence of arthritis could be made out, but the lumbar and thigh muscles were so rigid that movements of both the lower spine and lower extremities were greatly limited. The patient's gait resembled that of a boy walking upon stilts. A careful examination of the nervous system was entirely normal, except for this spasticity and muscle-nerve irritability. Nothing abnormal was found in the pelvis.



Fig. 1. As compared with control, *C*, changes were slight but definite. After six months there was no difference between the patient and the control.

The stools, in 1927, were constantly strongly acid, showed enormous quantities of free fat, fatty acid crystals, starch and meat fibres. The urine showed no abnormalities in the routine examination. The hemoglobin varied from 50 to 70 per cent, the leucocytes from 4,000 to 5,000 but there always existed a tendency to a leucopenia at the expense of the polymorphonuclear cells which varied from 35.5 to 45.5 per cent of the cells counted. The erythrocytes ranged from 4,070,000 to 4,900,000. Hypochromasia, poikilocytosis, anisocytosis, and constantly a few macrocytes were observed. The polymorphonuclear cells showed a distinct shift to the right. The Wassermann and Kahn blood tests had been repeatedly negative. No free hydrochloric acid by the fractional method (no histamine injection) was found in the stomach content. The blood calcium was 8.8 as compared with the average of the controls of 10 plus. No phosphorus determinations were made. The alkaline reserve (Van Slyke) was 50.0 vol. per cent. There was no edema.

A careful radiographic examination of the gastrointestinal tract showed only hyperactivity of the whole digestive tube. The gallbladder could not be visualized after the dye.

The bony skeleton showed a most marked rarifaction especially of the spine and pelvis, but this could also be noticed in the extremities. No evidence of arthritis existed, but only a process of decalcification.

A proctoscopic examination showed a mild proctitis.

At the time we felt that the case was one of mineral deficiency, probably due to a great loss of and a lack of absorption of minerals, but our conclusions were reserved until after observation of the effect of prolonged treatment. The patient was put on a non-irritating died consisting of milk, lean meats, finely divided non-irritating vegetables, gelatine and a small amount of butter. Sugar was allowed, but starches were restricted to the minimum. Calcium salts (carbonate and phosphate) were given by mouth and parathormone for a few days. Hydrochloric acid was administered with meals. To this treatment was added either sun light or quartz lamp. Six weeks of treatment raised the blood calcium to 10.1 mg. and repeated examinations since show values running from 10.0 to 10.4 mg.

Improvement was gradual but most gratifying, and, after six months, the patient has constantly served as a health nurse in a large department store. She is able to prevent recurrence of symptoms, but upon one occasion after being careless about her routine, she had a recurrence of the diarrhea and general body soreness. The blood calcium is now normal and the stools are free from fat. The x-ray films still show poor calcium of the bones of the hand as compared with the average normal control.

Discussion.—This patient's history and findings conform very well with the condition frequently described as "non-tropical sprue." A most carefully studied case is reported by Marble and Bauer in 1931. These authors carefully reviewed the literature and reported a case in which for the first time careful calcium and phosphorus metabolic studies were made. The patient was a man of thirty-nine who had had diarrhea for three years. Previous to that time he had had many mushy stools daily. The only known cause seemed dietary, but when the patient reported for examination the picture was that of (1) emaciation, (2) profuse diarrhea, (3) weakness, (4) marked caries of the teeth, (5) decalsification of the bones, (6) tetany, (7) achylia and (8) acid, fermentative stools, containing yeast-like organisms and an excess of neutral fat and fatty acid crystals. The patient's blood serum calcium was 6.7 mg. and serum phosphorus 1.28 mg. per 100 c.c. of blood. Their patient showed a mild pitting edema with lowered serum protein which probably accounted for a small part of the lowered blood serum cal-

cium. Their patient showed poor intestinal absorption of calcium and phosphorus even on a high diet. Almost all of these elements were excreted in the feces.

After their study they concluded that the conditions which hinder the absorption of calcium and phosphorus from the gastrointestinal tract eventually result in calcium deficiency and tetany, a type which can be differentiated from that of parathyroid insufficiency.

	Non-tropical sprue	Hypoparathyroidism
Serum calcium	Low	Low
Serum phosphorus	Low	High
Calcium excretion in feces	Increased	Normal
Phosphorus excretion in feces	Increased	Normal
Urinary calcium and phosphorus	Decreased	Decreased
Bone density	Decreased	Normal

After Marble and Bauer

The conditions which they believe led to the tetany of sprue are:

1. Dietary insufficiency of either calcium or phopsorus.
2. Deficiency in Vitamin D.
3. Diets containing a great excess of calcium over phosphorus and vice versa.
4. Long standing diarrhea.
5. Any disease hindering absorption from the gastrointestinal tract.
6. Long standing biliary or intestinal fistulas.
7. Excessive excretion of fat.

The blood in the typical cases may or may not be megaloblastic, but most of the recent cases treated are reported improved after feeding liver or liver extract.

Let us now contrast with non-tropical sprue the following cases which typify a large group.

Case 2.—Mrs. M. E. G. was first seen in 1925 when fifty-one years of age complaining of: (1) recurrent lower abdominal pain; (2) palpitation and rapidity of heart action; (3) muscle tremor.

She had never been seriously ill before and until the present trouble had had no confining illness. Her family history had no bearing on the present complaint. Her husband was dead and she had to support three children. Menstruation had stopped two years previously and she had been nervous ever since.

About six years before she consulted us she had some chronic intestinal indigestion with flatulence, epigastric pressure, soft stools and fatigue. She had always eaten large quantities of bread and potatoes. One



Fig. 2. Note decalcification as compared with the control, *C*.

year after the onset of the digestive symptoms, she began to have aching pains along the arms and legs, and fearing arthritis began to use cathartics, although never constipated before. For two years she used castor oil every other day. Three years before we saw her she began to have insomnia, palpitation of the heart, and spells of tachycardia lasting from a few hours to several days. No irregularity had ever been noticed. About this time she began to use large quantities of bran and other coarse foods because she believed she was constipated and had been warned about constipation by her medical advisors. She never allowed herself to go beyond a day without a bowel movement, and was happier if she had two or three bowel movements per day. About six months after the heart symptoms first appeared she began to have tremors with the attacks; she shivered, but had no chilliness nor fever. This was usually followed by two or three soft stools and the spell would gradually disappear.

She had had considerable abdominal soreness increased by laxatives, although laxatives relieved the general symptoms. Considerable gas was passed from the rectum and with the stools. At times she felt so sleepy that she was forced to lie down, a condition which was also related to the bowel function. She had been confined to her bed for weeks at a time because of heart symptoms and had been told she probably had serious heart trouble.

The physical examination showed a flabby, well nourished woman apparently moderately neurotic. The expression of the face was mask-like, not unlike that of early Parkinson's disease. The thyroid was slightly enlarged but no nodules were palpable. The gums were spongy, but the teeth, nasal sinuses and throat were

normal. (The tonsils had been removed one year before because of the pains). The blood pressure was 160/84 and there was a soft systolic blowing murmur at the apex of the heart, best heard in the axilla out-

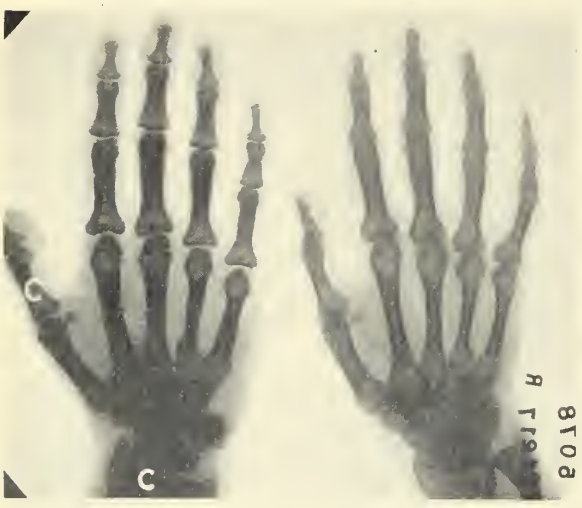


Fig. 3. A case similar to Case 2, which is reported.

side of the apex. There was no enlargement. The lungs were normal. The abdomen showed slight tenderness over the course of the colon. The pelvis showed nothing of importance.

The nervous examination showed exaggerated reflexes and muscle twitching, but otherwise entirely normal. Tenderness was present over the long bones and sternum upon pressure.

The blood showed moderate secondary anemia (hgb. 73 per cent; R.B.C. 4,500,000). The smear was normal, and the Wassermann blood test was repeatedly negative. The stools were strongly acid in reaction, fermentative and contained large quantities of undigested starch. The free acidity of the stomach contents was normal. The blood serum calcium was 10 mg. per 100 c.c. of blood.

The roentgen examination of the gastrointestinal tract was normal except for intestinal hyperperistalsis and hypermotility with spasticity at various locations.

This patient was unmistakably ill, although at the time we could only speculate as to the condition present. Organic heart disease was apparently excluded by observation and electrocardiogram. The patient was hospitalized and after prolonged observation we suspected there was some metabolic disturbance probably affecting the mineral balance, because the heart irritability, muscle tremors, and pain over the bones was very suggestive of a calcium and phosphorus disturbance.

The patient was placed on irritable bowel management, given calcium salts and sunlight. The symptoms completely disappeared after three months and the patient ever since has held a position as clerk of court. The bowels are regular and there are no cardio-circulatory symptoms.

Discussion.—This case is reported because it is the first patient (1925) in whom we suspected mineral deficiency in an apparently functional disturbance. She came from the northern part of the state where the water contains alkalies, especially magnesium salts. Cattle in the same locality, although given a well-balanced ration, have gradually developed a peculiar softening of the bones, especially in the second and third generations, which has been attributed by Dr. R. A. Gortner and associates as probably due to an excess of magnesium salts in the diet. Magnesium and strontium have been shown to partially relieve parathyroid tetany but to less degree than calcium, and, as in these cattle which had a tendency to diarrheal stools, may prevent the proper absorption of calcium in the intestine. These deficiencies do not appear acutely, but are the result of long periods of calcium-phosphorus poor diet or too rapid elimination. This patient living in the same locality was susceptible to the influences suffered by the cattle, probably had an increasingly negative calcium balance which was exaggerated by the high vegetable diet and excessive use of cathartics. Although vegetables contain considerable calcium, the magnesium is far in excess. The treatment was nothing more than a retracing of steps in the history. The results were suggestive.

Case 3.—Mrs. G. N. D. was first seen at her home September 21, 1931, when forty-one years of age, complaining of fatigue, palpitation of the heart, chronic indigestion, various pains in the extremities and mental depression.

The family history had no bearing on the case except that she had five children, and in spite of ideal hygienic care there had been rickets in two of them and one had had several fractures of the bones.

The present complaint began about four years previously, but symptoms were attributed to the fatigue of frequent pregnancies and social duties. The first symptom was fatigue and indigestion associated with belching and passing of gas. The appendix was removed and she was better for a year or more. One and one-half years previous to the present complaint she became very fatigued, had indefinite indigestion and was forced to bed for a rest. The heart became rapid and irregular. She then had short periods of improvement, but for the most part had been confined to her room. Because of the indigestion, she had daily for several months taken milk of magnesia, low caloric intake and a low mineral content diet. Menstruation had recently become frequent and copins. She complained of many "rheumatic" pains, and there was definite bone tenderness.

The physical examination showed signs of extreme fatigue, but mentally the patient seemed stable and unusually intelligent. She was well nourished but flabby, and there was a tendency to an excess of fat distribution about the pelvis and thighs. The gums were spongy and there was some retraction. She had had trouble with progressive caries. The thyroid was slightly enlarged, but contained no nodules. The heart was not enlarged, but a soft blowing systolic murmur could be heard over the apex. There was some tachycardia and an occasional extra systolic arrhythmia. The abdomen was negative except for tenderness over the course of the colon. The pelvis was normal except that the uterus was slightly enlarged and rather firm. Examination of the nervous system showed very active reflexes. The blood pressure was 118/76.

The blood, urine and blood calcium were normal. The stools were mushy, acid in reaction and showed the signs of marked starch fermentation.

The gastro-intestinal examination showed a poorly functioning gallbladder, but no shadows to suggest stones. The stomach outline was normal, but the small intestine showed very marked activity and the colon had eliminated a large part of the barium meal within twenty-four hours. The stomach contents showed a constant decrease of free hydrochloric acid. The x-ray of the hands with a normal control showed a definite decrease of calcium salts.

We suspected in this case a calcium deficiency related to excessive bowel activity and the long use of magnesium as a laxative.

Treatment consisted of giving calcium salts, liberal vegetable and milk diet, and the elimination of all cathartics. Recovery was complete at the end of six months and the hands showed a return to normal calcium density.

Discussion and Summary.—These last two cases are typical of a considerable group of cases which we have studied during the past five years. The symptoms seem to occur so frequently that they probably indicate a clinical entity. Unfortunately, no complete metabolic studies could be made, for obvious reasons. A typical hypothetical case might be described as follows:

Possibly in a family where there is a history of infantile rickets or spasmophilia, in spite of good living conditions, an adult patient begins to have symptoms of indefinite indigestion associated with signs of increased intestinal peristaltic activity with mushy or alternatingly mushy and spastic stools, or a recurrent diarrhea. Defecation is often explosive and accompanied by the passing of a large amount of gas. The stools are for the most part strongly acid in reaction with a sour, yeast-like odor. Large quantities of undigested starch associated with yeast-like organisms and more frequently clostridia are noted in most cases if the stools are repeatedly examined when fresh. An increase of fatty acids and sometimes neutral fat may be found in the more severe cases. The patients after some months usually complain of dull headaches, sleepiness, lassitude and body soreness. Tenderness is frequently present over the long bones and muscles. Spongy gums and rapid caries may appear for the first time or may have been present for years before. The patient may complain of frequent canker sores or in the more serious cases a definite glossitis may appear. Because of the symptoms and especially because of the periods of spastic stools with distress, the patient begins to take cathartics which whip up an already present intestinal hypermotility. This catharsis, especially if the drug contains magnesia, apparently increases the symptoms. There is increasing physical debility and nervous depression. Muscle twitching and sometimes tremors appear, usually associated with an irritable heart action. Fundamentally, these patients usually do not belong to the visceroptotic asthenic type, but more frequently to the intensive intelligent type and, when well, are remarkably free from complaints and symptoms of neurasthenia. In other words they more frequently belong to the intensive "go-getter" type of individual. Sometimes the symptoms seem to be increased by pregnancy, and very often are worse in the summer months when on a high vegetable diet. Many of the patients seem to have had an aversion to milk and cheese throughout life, and probably have always been on a relatively low calcium diet.

The stomach contents may show an achylia, decreased free hydrochloric acid or a normal acidity. The total blood calcium is normal but often near its lower value.

Any condition which whips up intestinal peristalsis or prevents absorption accentuates the symptoms.

Some of the women, especially those over forty years of age, have menorrhagia. The basal metabolism is frequently slightly below normal. The blood may be normal, show a slight secondary anemia, or occasionally show many macrocytes.

If, upon radiographic examination of the bones, especially the hands, there is a definitely decreased bone density as compared with carefully picked controls, the diagnosis seems very likely. The increased bone density and the dis-

appearance of the symptoms with the improvement of general health when upon treatment makes the diagnosis much more certain. This condition can only be suspected in the earlier stages before the withdrawal of calcium from the bones, but a therapeutic test is justified. Deductions, however, from such results can only be reserved.

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CASE REPORTS

COARCTATION OF THE AORTA*

REPORT OF TWO LIVING CASES

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Recently I[2] discussed the subject of "Coarctation of the Aorta" and presented the case history of a boy now seventeen years of age who has been under my observation for more than ten years. Since presenting this case I have had the opportunity of studying another case of the same type in a boy six years of age. It seems of value to report the six year old boy. I believe he is the youngest living case to be reported.

As was pointed out in my previous article, Bonnet divided all cases of congenital stenosis of the aorta into two main groups, infantile and adult. The infantile type consists of a diffuse narrowing of the isthmus of the aorta. The adult type includes those cases which present a sharp constriction of the aorta even to the point of a complete atresia in the region of the insertion of the ductus arteriosus. It was the impression of the older writers that adult coarctation of the arota was due to a fibrosing process in the aorta which was carried over from the normal post-natal fibrosis which occurs in the ductus arteriosus. Evans[1] has recently presented a number of reasons which he believes is good presumptive evidence that adult coarctation is due to maldevelopment of one of the branchial arches rather than to any post-natal fibrosis.

Evans has divided the adult type into six groups, the first three of which are of practical importance. Type I consists of a stenosis of the aorta in the region of the ductus arteriosus, patency of the ductus arteriosus, and hypoplasia of the proximal aorta. In this type the development of collateral circulation is unnecessary as the blood is shunted through the patent ductus arteriosus into the pulmonary circulation resulting in hypertrophy of the pulmonary artery which is usually larger than the aorta and in a right sided hypertrophy of the heart with usually a hypoplasia of the left ventricle. Type I is difficult to diagnose clinically as none of the characteristic vascular signs of the other two types are present. However, the patency of the ductus arteriosus can be diagnosed and the stenosis of the aorta may be suspected from the more or less characteristic x-ray picture.

Type II and Type III differ only in degree of stenosis of the aorta. In Type II there is a marked stenosis, the ductus arteriosus is closed, the proximal portion of the aorta is hypertrophied. In Type III the same conditions prevail but there is a complete atresia of the aorta close to the insertion of the ductus arteriosus.

It is my impression that the two cases I am to present belong to Type III. I believe they have complete atresia of the aorta and that the ductus arteriosus is closed in each case.

The first boy, who is now almost eighteen years of age, has unusually high color to his face. He appears to be unusually well. There is a marked pulsation of the vessels of the neck and episternal notch. Examination of the heart reveals enlargement to the left. The heart sounds are regular and pounding. At the apex and over the aortic area a blowing systolic murmur is heard. At the back of the chest on either side of the vertebral column a prolonged hemic type of murmur is heard which is quite characteristic of this condition. In fact, it is this murmur in my second case which led me to suspect the correct diagnosis. Because of the obesity it is impossible to see the enlarged collateral vessels on this boy's chest, but on palpation a number

*From the Lymanhurst School Heart Clinic, Minneapolis, Minnesota. Read before the Minnesota Society of Internal Medicine, Minneapolis, May 15, 1933.

of thickened, enlarged, rather tortuous pulsating vessels can be made out, especially on the posterior chest wall. If one runs the hand down this boy's body it will be noted that a distinct and remarkable drop in temperature is noted at about the waist line and especially over the left buttock. This is especially well brought out with the patient in a cold room. While the radial pulse is full and bounding the femoral and popliteal pulsations can not be palpated. The blood pressure in the right arm is: systolic 204, diastolic 100; left arm, systolic 185, diastolic 100. The blood pressure in the legs can not be obtained. The electrocardiographic tracing is normal. The roentgen examination reveals a second degree "hypertension heart" with characteristic left ventricular enlargement and erosion of a number of the ribs; the erosion of course, due to the enlarged intercostal arteries. The normal aortic knob is not present (Fig. 1).

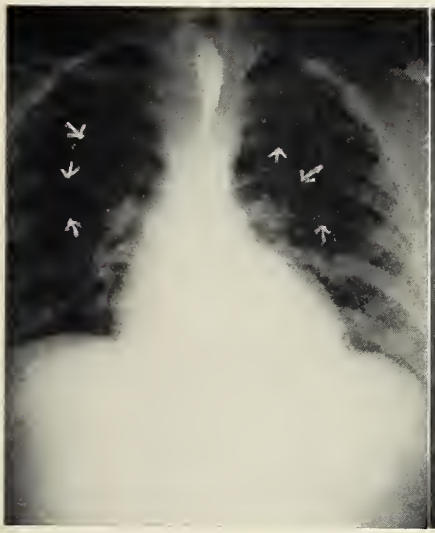


Fig. 1. Six-foot radiograph of the heart of an eighteen-year-old boy with coarctation of the aorta which reveals left ventricular hypertrophy and several areas of erosion in the ribs as indicated by the arrow marks.

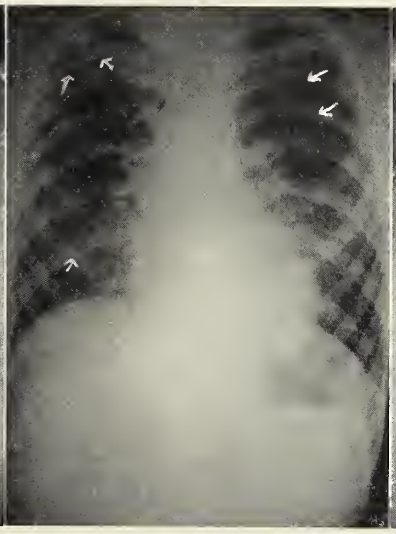


Fig. 2. Six-foot radiograph of the heart of a six-year-old boy with coarctation of the aorta which reveals beginning left ventricular enlargement and also shows several areas of erosion in the ribs as indicated by the arrow marks.



Fig. 3. Visible and palpable enlarged collateral vessels in the posterior surface of the chest in a six-year-old boy with coarctation of the aorta.

The second boy is six years of age and he, too, appears to be unusually well. He was referred to the clinic because of a "murmur in his heart." Clinical examination of his heart reveals no marked enlargement, a systolic rather short murmur is heard over the apex and over the aortic area. At the back can be heard the characteristic hemic murmur on either side of the spine exactly the same as in the previous case. On careful inspection in favorable light a number of pulsating dilated vessels can be made out in the intercostal spaces posteriorly. I have chalked over these vessels to make them stand out more clearly (Fig. 2). As in the first case the radial pulse is full but the pulse in the lower extremities can not be palpated. The blood pressure in the arms is: systolic 134, diastolic 80. It can not be obtained in the legs. There are no surface temperature abnormalities in this case. The electrocardiogram is normal. The roentgen examination reveals slight enlargement of the heart, which shows a tendency toward a left ventricular enlargement. Careful inspection will reveal a number of areas of erosion in several ribs. It is rather remarkable that this erosion should have occurred at so early an age (Fig. 3).

The diagnosis of coarctation of the aorta is made in both of these boys on the following diagnostic findings:

1. The establishment of collateral circulation as evidenced by the visability and palpation of the dilated vessels on the chest and by the characteristic hemic murmur heard over these vessels and also by the erosion of the ribs as revealed in the x-ray film.

2. The increased blood pressure in the upper extremities and the absence of blood pressure in the lower extremities.

3. The left ventricular hypertrophy revealed by the x-ray film, and the absence of the normal aortic knob. In the older boy fluoroscopic examination reveals an increased pulsation of the aorta to the right of the sternum. In the left oblique position a rather abrupt diminution in size of the aortic arch is made out presumably at the point of constriction.

It is my impression that these cases belong to Type III as described by Evans because there is no evidence of patency of the ductus arteriosus. The marked development of collateral circulation at so early an age makes the diagnosis of complete atresia of the aorta quite probable.

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ANIRIDIA*

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Aniridia is a term used to denote congenital absence of the iris, but it is entirely possible that section of an eye with this anomaly might show the root of an iris to be present. Clinically, however, the iris loss seems to be complete. One of the good recent accounts of this disease is to be found in Seefelder's chapter in Schieck and Bruckner's *"Kurzes Handbuch Der Ophthalmolo-*

*Read before the Minnesota Academy of Ophthalmology and Otolaryngology, February 10, 1933.

gie." The following discussion is based on liberal reference to this chapter.

Although the most conspicuous feature of aniridia is absence of the iris, it is usually associated with other defects found in aniridia may be traced back to a common origin, namely an arrest of development of the associated ectodermal structures (retina, lens, zonule). This arrest may not be equally marked in all areas.



Fig. 1. Eyes of patient D. L., showing absence of iris.



Fig. 2. Eyes with normal irides.

abnormal findings such as visual impairment (usually pronounced), photophobia, nystagmus, anomalies of the lens such as total cataract, anterior and posterior polar cataract, dislocation, diminution in size, and anomalies of the suspensory ligament (ectopia of the lens). There may also be hypoplasia or aplasia of the ciliary processes and of the fovea centralis. Atrophic choroidal spots, vitreous opacities and detached retina may be found.

Aniridia is more definitely hereditary than any other anomaly of the eye, at least in man. Thus Risley found 114 cases of aniridia in four generations of one family. In lower animals aniridia is but rarely seen. The simultaneous appearance of other malformations of the iris in aniridia families is especially interesting. Thus in an aniridic family observed by Clausen there was found a case of bilateral inferior coloboma of the iris, and another of slit-like defects of the iris stroma with an apparently intact layer of pigment epithelium. In another aniridic family reported by Lindberg, one child presented marked defects of the stroma layer and smaller defects of the pigment layer, the iris being of normal surface extent. In addition there were marked amblyopia, some nystagmus, lens opacities, and absence of the fovea centralis. This was also the case in the patient's brothers and sisters, who had complete absence of the iris.

Microscopic inspection of eyes with aniridia has often disclosed the presence of a narrow stump of iris in more or less its entire circumference, even though clinically no iris could be seen. In some cases this root is attached to the posterior corneal surface as an anterior synechia, and in others the root projects free in the anterior chamber. In a number of cases the iris was, in fact, fairly broad; and yet, even in these there was no evidence of a spur of iris musculature, despite the fact there was ample room for it. However, von Bohm and von Hippel were able to demonstrate some evidence of atypically developed iris muscle. In a number of cases the angle of the anterior chamber was obstructed because of the unusual development of the uveal structures, or because of the adhesion of the iris root to the posterior surface of the cornea. Thus the comparative frequency of glaucoma in cases of aniridia may be explained.

A most important anatomic finding, which was also noted clinically by Velhagen and others, is the absence of the fovea centralis. This explains the loss of vision of aniridic eyes better than all the other changes, as, for instance, cataract. This visual loss is often present long before any appreciable loss due to the cataract may have set in.

Principally because of the absence of the fovea, and secondarily because of the changes in the lens and the zonule the theory is advanced that the entire group of

The most weighty objection to this view is that of von Bohm, who feels that aniridic eyes with good vision, as occasionally observed, do not fit in with Seefelder's theory, for as a matter of fact, in a number of cases such high visual acuity has been found (in one case it was 20/20) that an aplasia of the fovea is out of the question. However, as opposed to these patients with comparatively good vision there is a great preponderance of those with poor sight. In most cases the low degree of visual acuity cannot be explained by the lens opacities. At birth and in the early years of life these opacities seem to be of little consequence, so that the nystagmus must be due to some other cause. Further, young individuals who have a well developed fovea and who later develop opacities of the media (as for instance, zonular cataract), do not develop nystagmus even when the vision becomes markedly reduced. Lindberg's case showed that the iris might be comparatively well developed and the fovea absent. Seefelder does not believe that aniridia may be due to mechanical hindrance to development of the iris by excessively long contact of the lens with the cornea.

The history of the case reported herewith is as follows:

D. L., a boy of six, was admitted to the clinic June 21, 1932. He is one of three children, the other two being normal girls. This child is in good health except for his vision. He thinks that he sees better when he is close to objects than at a distance. He now has occasional headache. Bright light used to trouble him greatly as a young child, but not now. He has just recovered from scarlet fever.

A general physical examination was made August 2, 1932, and he was found to be entirely well. External examination of the eyes showed the following: (1) apparently total absence of the iris in both eyes; (2) an oval cataractous opacity in the central part of the right lens about 3 x 5 mm.; (3) optical nystagmus, and under cover each eye turned out about ten degrees; (4) form fields normal in both eyes; (5) visual acuity of 6/200 in each eye; (6) normal tension.

A diagnosis was made of aniridia, complete and bilateral, and of cataract of the right eye.

He had been wearing O.D. + 1.50 S. ⊃ + 2.00 C. x 90 which gave him 10/200 vision, and O. S. + 2.00 S. ⊃ + .75 C. x 90 which gave him 20/200. I have already stated that his uncorrected acuity was 6/200 in each eye. On June 28, 1932, a refraction was attempted without a mydriatic, as a matter of interest, but the ciliary muscle was so active that satisfactory retinoscopy could not be done. Under atropin a week later he accepted O. D. + 2.25 S. ⊃ + 1.25 C. x 115 to get 20/100 vision, and O. S. + 2.00 S. to get 20/100 vision also. Further improvement was not possible.

FOREIGN BODIES IN THE BLADDER*

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Foreign bodies,† other than vesical or renal calculi, include a large variety of articles, the same gaining access to the bladder by various methods. A bullet may lodge in the bladder or a portion of clothing or bone may be carried into the bladder by a bullet or by some other penetrating objects. Also a foreign body may ulcerate into the bladder from the intestine or from the peritoneum, or a foreign body may cause a puncture wound of the perineum or of the abdominal wall, enter the bladder, break off and a portion of it remain behind. Such foreign bodies may be sticks of wood, branches of shrubs or trees, or pointed metal objects, teeth or hair from a ruptured dermoid cyst. Again, foreign bodies may enter the bladder through a fistula. However, most foreign bodies enter the bladder through the urethra. Portions of old and rotten catheters and filiform bougies have thus, not infrequently, been found. The great majority, however, have been introduced by individuals either in curiosity, or from morbid sexual motives. The latter class of accidents are much more frequent among women than men. Such foreign bodies inserted into the urethra usually accidently slip out of reach and into the bladder. Among such bodies introduced for such purposes may be mentioned hairpins, pencils, sticks of sealing wax, chewing gum, beads, shots, catheters, bougies, straws, feathers, clinical thermometers, glass rods, wax tapers, stems of plants, sprigs of wheat, pieces of slippery elm, pork rinds, pieces of tar, needles, common pins, safety pins, penholders, pencil cases and toothbrush handles. Gross found three caudal vertebræ of a squirrel in the center of a vesical calculus taken from the bladder of a man age thirty-five. It was afterwards elicited that the patient had practised masturbation with the tail of this animal. Sharp and irregular bodies may cause pressure ulceration and even perforation with infiltration of urine. Needles may become embedded in the bladder wall.

A few months ago I was called hurriedly to examine a young man who was bleeding from the urethra. I found him to be a white man, aged nineteen, a kitchen helper and a waiter in a boarding house. His appearance was pale, and anxious, although he was not complaining of any severe or sharp pain when resting quietly. His present complaint consisted of a sudden bleeding from the urethra. He did not know how much blood he had lost. Blood appeared also when he urinated.

Examination revealed a normal temperature and pulse of 78. His past history was essentially negative. Examination revealed some oozing of blood from the urethral orifice and some dry blood on the head of the penis. My first impression was that the patient was suffering from a papilloma of the bladder. However, further examination of the external genitals disclosed a definite hard object to be felt in the perineum. This, the patient then told me, he had also noticed. A digital rectal examination confirmed this finding.

I now requested that the patient enter the hospital for x-ray examination. Further questioning disclosed no evidence of what had evidently taken place and the only answer that I could get to my several questions, was always the same, "that he had swallowed some glass ten years ago," and in this answer I presume he wished to give me a clue. The x-ray film as shown here reveals distinctly a broken off piece of glass tube or glass catheter, definitely within the bladder and the broken off portion pointing towards the urethra.

Under spinal anesthesia and assisted by Dr. Mackey, a suprapubic cystotomy was performed, the glass tube found, firmly lodged in the bladder and removed without any special difficulty. The bladder was closed in the



usual method without drainage, except for a small rubber tube placed for temporary drainage in the space of Retzius. He made an uneventful recovery and left the hospital in the usual post-operative period. Cross examination of this patient, following his operation, could not sway him from his former and persistent statement, "that he had swallowed some glass ten years previously."

*Read at the regular staff meeting at the Eitel Hospital, Minneapolis, May 19, 1933.

†Gould, G. M., and Pyle, W. L.: Anomolies and Curiosities of Medicine, p. 676, 1897.

KOREMLU

The *Chicago Tribune* of Sunday, July 17, 1932, issued the statement that a voluntary petition in bankruptcy was filed by Koremlu, Inc., depilatories, of 11 West 42d street, listing liabilities of $2,448,745 and assets at $2.93. There seems to be accumulating evidence, however, that the individuals, or at least some of the individuals, who have been connected with the exploitation of Koremlu as a depilatory have decided that there is too much money to be made in the depilatory business to abandon it, even if dozens of women have been injured by their old product. There is now appearing on the market an alleged depilatory called "Croxon" which emanates from the same office as that of Koremlu. Croxon, Inc., was brought into existence January 29, this year, and the president of the concern is said to be one A. W. Lublin. According to an advertisement, Croxon "will permanently destroy both hair and roots in three to six months. Even though we are not yet in a position to publish the complete composition of Croxon, it is our opinion that Croxon will not destroy both hair and roots, either in three months or three years. (Jour. A. M. A., July 30, 1932, p. 407.)

President's Letter

To the Physicians of Minnesota:

Within a few days the annual Christmas Seal sale will be taking place throughout the State. The sale of these seals is the sole support of the Minnesota Public Health Association and its constituent county tuberculosis associations.

There is no other public health education program in Minnesota and elsewhere that is so important and so deserving of the support of the physicians as this one.

Let us as an organization and as individuals do all that is possible to aid this program of education against tuberculosis and coöperate in every way in the Christmas Seal sale.

Yours very truly,



President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

Official Journal Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society.

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Vol. XVI November, 1933 No. 11

SHALL I STUDY MEDICINE?

The choosing of a vocation is almost as important a step in the life of a young man as selecting a wife. The youngster is not likely to adhere to his early ambition to become a fireman or an aviator, and the grade school boy who knows what he wants to do or be when he becomes a man is an exception. Occasionally a boy's career is planned for him by a fond parent, but only occasionally does such a career materialize. Studies in high school and even in college usually are chosen only in a general way, with a definite career in mind. Often no greater tragedy can occur than the thwarting of a distinct inclination or ambition on the part of a boy to follow a definite career.

It is said that the practice of medicine used to be very much like the ministry as far as financial return was concerned. It may have been. Certainly in recent years, mercenary motives have influenced the youth of this country in their choice of medicine as a career. It is safe to say that the majority of such have been disappointed. On the other hand, it is probably true that a young man of average intelligence and industry could feel assured that the chances of making a fair living would be as good in the practice of medicine as in any other profession or commercial career.

The warning has been issued in various quarters that the medical profession is overstocked and that young men should be discouraged from entering the profession for their own good and the good of the profession. It is true that the country could get along with fewer physicians. The estimate has been made that there is about one physician for every 720 people in this country, a much higher ratio of physicians to population than in many civilized countries and about twice as many as in England and Wales. Last year there were daily over 15,000 patients in government supported hospitals in Minnesota, compared with some 20,000 in private hospitals. Probably it is a safe estimate that half of the population is not served by private practitioners. It would be interesting to know how many of the 157,000 licensed physicians in the country are in private practice and dependent on this half of the population for their livelihood.

There is danger that the present oversupply of physicians in the country may be aggravated by the situation in Germany. Jewish physicians have already left Germany, and doubtless a certain number will attempt to obtain licenses in the various states.

We must not be too pessimistic, however, in our advice to prospective medical students. What profession or industry is not crowded? A com-

parison* of the present status of the legal and medical professions, recently published, is of interest. The medical profession is in a far better situation than the legal profession as far as educational institutions and licensing are concerned.

Our medical schools number about half those existing in 1900, and 95 per cent of them are approved by our national association. The standard of medical education has been so raised in recent years and state license requirements are so exacting that few poorly prepared physicians are being admitted to practice. The number licensed last year is about the same as in 1904.

Less than half of the law schools, on the other hand, are approved by the national bar association. Admission to the bar is largely by examination with apparently little attention paid to where the applicant has received his preparation. Less than half of the examinations for admission to the bar in 1932 were passed.

While the number of physicians in the country has increased from 132,000 in 1900 to about 157,000 in 1933, the legal profession has increased in this period from approximately 107,000 to 175,000. Of course, once a man has prepared himself to practice medicine he is less likely to change his vocation, which is not true of the law graduate.

It is natural for a son to follow in his father's footsteps when it comes to the choice of a profession. This is very evident in the families of physicians. The idea of becoming a doctor has a distinct idealistic appeal to youth. Is there sufficient reason to discourage our sons from following in our footsteps? The less likelihood of large financial return in the practice of medicine in the near future will deter some whose only motive is financial. This will not be detrimental to the personnel of the profession, unless the encroachment of government and free medical care reaches the point where the opportunity of a fair return from the investment of money and time in a medical education will not attract the superior type of youth.

HIDDEN DANGERS IN VOLATILE GASES

There is evidence that the public has not received sufficient warning of the danger that exists to health and life in the careless handling of some of the new and old chemicals used in everyday life.

You purchase one of the newer fire extinguishers which is a liquid contained in glass bulbs. The bulbs are to be broken and the liquid scattered on the fire. You are told frankly that the bulbs contain carbon tetrachloride and you know you are paying an outrageous price, but the desire of protecting your home from fire leads you to be robbed knowingly. You are informed that the carbon tetrachloride will not stain or damage fabrics. But you are not informed that this liquid when exposed to flames is capable, like chloroform, of generating deadly phosgene fumes which in a closed space may be fatal. In a recent editorial in the *A. M. A. Journal* two fatalities are reported from the use of a patent preparation of carbon tetrachloride in extinguishing the burning clothing of two men.

Methanol can be bought in the bulk in the open market. How much warning is given the purchaser, we don't know, although when mixed with varnish the fumes are decidedly dangerous.

Many a housewife has learned from experience that the use of benzine and other cleaning fluids is very likely to produce a harmful effect if used in a closed room.

The widest publicity should be given to the danger that lies in certain of these liquids in common use. To be forewarned is to be forearmed.

DULUTH MALIGNED

The hay fever sufferers are leaving Duluth and the Arrowhead country. Very favorable reports are accumulating this year indicating that the efforts of the health commissioners of Duluth and a committee of the Chamber of Commerce have accomplished much in the cleanup campaign for abolishing baneful weeds and pollens. Duluth and the North Shore in some recent years suffered something of an abridgement of their former popularity with those condemned to seasonal allergic distress, whether it be ordinary hay fever, asthma or allied disorders. As agriculture developed south of Duluth and people became more careless of their own waste lands, the roadsides or gardens, the iniquitous ragweed and its associates made this less of a haven of relief for natives and visitors.

From all reports, however, a very great improvement has obtained, and whereas Duluth has

*Admission to the Professions of Medicine and Law: A Comparison Federal Bulletin, October, 1933. Reprinted from Notes on Legal Education, July, 1933.

never deigned to malign any other climatic zone (despite the lugubrious and studied weather insults hurled toward it; for example, the vaudevillian who amid the conceit of Kansas City said he had just come from a place up in the Far North, known as Duluth, "Where there is nothing between you and the North Pole but a screen door"), we announce a most successful hay fever season. Addressing that great crowd of perennial vacation seekers with the best excuse in the world—puffy turbinates and horrific nights—come to the North Shore next year and be happy! "The great open spaces" mean nothing—unless the upper air passages are included.

E. L. T.

CORRECTION

Attention has been called by Dr. O. McDaniel, Director of the Division of Preventable Diseases of the Minnesota State Board of Health, to an error as to the number of cases of syphilis on record with the Division cited in an article by Dr. S. E. Sweitzer entitled "Adequate Therapy of Syphilis," which appeared in the September number of MINNESOTA MEDICINE. The author stated that the cases seen at the Minneapolis General Hospital Clinic during 1932 constituted one-third of all the cases in the state in 1932. Instead, this number constituted a third of the cases in Minneapolis. The source of the error as to the figures has not been traced, but the correction should be, and is herewith, made.

Except in Minneapolis and Duluth venereal cases are reported directly to the Division of Preventable Diseases and the cases of syphilis reported in 1932 were: Minneapolis, 1,204; Duluth, 478; state (exclusive of Minneapolis and Duluth) 2,351; total, 4,033.

Attention may be called to the fact that in 1929 the former Division of Venereal Diseases of the State Board of Health was abolished and this work was placed under the Division of Preventable Diseases.

OF GENERAL INTEREST

Dr. N. Logan Leven has announced the opening of an office at 927 Lowry Medical Arts Building, Saint Paul, for the practice of surgery.

Dr. James J. Swendson of Saint Paul was elected a Fellow of the American College of Surgeons at the recent meeting of that organization in Chicago.

Dr. C. W. del Plaine, after serving as resident surgeon at the Miller Hospital, Saint Paul, has opened an office at 1942 Henepin Avenue, Minneapolis.

Dr. Francis W. Lynch has opened an office at 317 Lowry Medical Arts Building, Saint Paul, for the practice of medicine in caring for diseases of the skin and allied conditions.

Dr. Charles N. Spratt attended a meeting of the Pennsylvania State Medical Society in October, where he showed moving pictures of his methods of operating on glaucoma and cataract.

Dr. L. M. McQuire, heart specialist at the United States Veterans Hospital, Fort Snelling, has been transferred to Denver, where he will review the government pension cases for the balance of the year.

Dedication of the new nurses hall at the University of Minnesota was a feature of the annual homecoming program in October. The building was erected at a cost of $385,000 and has housing accommodations for 284 nurses.

Dr. E. S. Mariette of Glen Lake Sanatorium, Oak Terrace, Minnesota, presented a study on the student tuberculosis problem and a clinic on the use of x-ray in diagnosing tuberculosis at the recent meeting of the Mississippi Valley Conference on Tuberculosis held in Kansas City, Missouri.

Last month an oriental, D. Yomogita, claiming to have an M.D. and a Ph.D. degree, and stating that he was inspecting the mental hospitals of this country, left rather unexpectedly after having been taken to the state hospital at St. Peter. His claim to be conversant with several languages was not substantiated. His real purpose seemed difficult to construe.

The organization in Minneapolis of a naval reserve medical unit, to be known as United States Naval Hospital Unit No. 7, has been begun by Dr. C. E. Henry, who formed and commanded the Minneapolis unit in the World War. The new unit, which is to be formed for service only in an emergency—in the event of war—will be the first formed in the Northwest since the World War. Dr. Henry received authority from the headquarters of the ninth naval district at Great Lakes station to secure applications for the unit.

R. G. Leland, Chicago, director of the Bureau of Medical Economics of the American Medical Association, spent Monday, October 16, in the Twin Cities consulting with medical society officials.

He attended a noon luncheon conference with the executive committee of Hennepin County Medical Society and an afternoon conference in Saint Paul with officers of the Ramsey County Medical Society. He left for the West in the evening following a dinner in his honor at the Nicollet hotel in Minneapolis arranged by E. A. Meyerding, secretary of the State Association.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

UNLICENSED PHYSICIAN PLEADS GUILTY TO PRACTICING MEDICINE

State of Minnesota *vs.* John G. Halland

On September 9, 1933, John G. Halland, thirty-nine years of age, entered a plea of guilty to practicing medicine without a license, before the Honorable Anton Thompson, Judge of the District Court, at Fergus Falls, Minnesota. Halland had been practicing medicine at Pelican Rapids, Minnesota, for two months without a license. The defendant formerly was licensed to practice medicine in the State of Minnesota, but his license was revoked in November, 1931, by the State Board of Medical Examiners, because of Halland's habitual indulgence in the use of narcotics.

Judge Thompson sentenced Halland to a six months term in the Otter Tail County jail. This sentence was suspended upon Halland's agreeing to return to his family home at Fargo, North Dakota, and upon his obeying the laws of the State of Minnesota, and also

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Medical Care and Relief

FOR the first time on record a definite policy of paying from relief funds for medical service has been officially established. As a result, Federal Emergency Relief funds are now available for payment for medical care of the indigent in their homes and, in restricted instances, for care of ambulatory patients in the doctor's office.

This recognition of the legitimacy of the doctor's bill as compared with the bill of the grocer, the coal man, the landlord, is welcome and, in fact, overdue.

The detail involved in working out a satisfactory scheme for payment of medical service is another question and one which calls for the best thought of both physicians and relief agencies.

The question of what is a fair fee schedule for such work has been considered carefully and at length by representatives of the medical profession conferring with the state officials in charge of payment of funds. Their proposal is now ready for the consideration of physicians and it should be studied thoroughly.

It is doubtful if anyone will quarrel with the fees suggested for this service. In point of fact, many a physician has been performing the same services without any expectation of pay whatever, during the last two or three years. Often he has done it at considerable expense to himself.

Discussion of what constitutes a proper fee schedule will undoubtedly revolve instead about the propriety of sanctioning a set fee schedule at all.

Is the medical profession allowing itself to be definitely and officially committed to a schedule that can be enforced upon it at some future time when it is not a question of providing care for the needy but of providing care under some plan of state medicine for other groups of persons?

That question will be asked, and legitimately. At the same time the need for an established and understood basis for payment on the part of the relief agencies must not be forgotten; nor the needs of the unemployed for whom the funds were appropriated.

Nothing that the profession does for the sake of present policy and future contingencies must be allowed to stand in the way of the fullest possible utilization of these funds to care for the needy. The fact that there are people in remote counties who have been beyond the reach of medical service has been a matter of concern to the profession for some time. Physicians who might gladly have cared for these people without charge, had they been close by, have been unable to travel long distances at their own expense to aid them.

The new relief funds will allow mileage to the doctor as well as 50 per cent of a basic fee for home care of all such people.

The medical service thus financed is limited to home care and essential office care of ambulatory patients, though ambulatory patients will be directed when possible to whatever free clinics are available.

The policy to be followed in this matter by the government and government agencies as stated in the preamble to the rules and regulations will have the full approval and coöperation of the physicians. Note, for instance, the following paragraphs:

"It is hereby declared the policy of the Board of Control to recognize within the legal and economic limitations the traditional family and family-physician relationship in authorization of medical care for indigent persons in their homes and the traditional physician-nurse relationship in the authorization of bedside nursing care. The aim of these regulations shall be the provision of good medical service at a low cost—to the mutual benefit of the indigent patient, the physician, the nurse, the taxpayer. . . .

"In issuing these regulations, the Board of Control recognizes that no regulations can be all-inclusive and that many questions of interpretation will have to be referred to the Board for decision. In order to carry out this aim (above stated) the Board requests the full coöperation of the medical profession in observing the same high standard of professional ethics as is followed in their private practice."

the State of North Dakota. Judge Thompson made these conditions a part of the order suspending the sentence. A written report is to be submitted to the Court upon the first Monday in each month until November, 1934, showing the whereabouts and the occupation of the defendant.

The State Board of Medical Examiners acknowledges the splendid coöperation shown in this case by Mr. John L. Townley, Jr., County Attorney of Otter Tail County. The manner in which the case was disposed of by Judge Thompson indicates the fairness and frankness of the Court in this matter.

Petition Withdrawn to Operate Terpezone Institute

On September 18, 1933, the Saint Paul City Council held a public meeting to consider the rezoning of property at Hamline and Capitol Avenues in the City of Saint Paul. The purpose of the petition for rezoning the property was to enable certain people to operate what would have been known as the Hamline Clinic and Hospital. The petitioners were represented by Senator George L. Siegel, who stated that he was appearing for one Mr. J. J. Hicks, who is interested in the sale of Terpezone machines. These machines are purportedly for the treatment of tuberculosis and other respiratory ailments. The rezoning was opposed by Mr. Brist on behalf of the State Board of Medical Examiners and Ramsey County Medical Society. Mr. Edward A. Knapp also appeared in opposition on behalf of the Ramsey County Public Health Association.

Terpezone had previously been submitted to the Council on Pharmacy and Chemistry of the American Medical Association and was found "unacceptable for New and Non-official Remedies because no satisfactory evidence is presented to show that Terpezone is pinene ozonide or that in the manufacture of the product the formation of injurious by-products is controlled or prevented; because the claimed harmlessness of the product is not established, and because it is marketed with unwarranted and exaggerated claims of therapeutic value."

After hearing both sides and noting that the sentiment of the Council was not in favor of such a plan, Mr. Hicks personally withdrew his petition. The Minnesota State Board of Medical Examiners has taken the stand that the use of Terpezone to treat tuberculosis or any other ailment, constitutes the practice of healing and as such, if used at all, can only be used by one licensed to practice medicine and healing in the State of Minnesota.

TO ALL MEMBERS OF THE MEDICAL PROFESSION

The Minnesota State Board of Medical Examiners has received several complaints concerning itinerant quacks and unlicensed practitioners of healing that are very difficult to handle due to the fact that these individuals remain in a locality only for a day or two. This is particularly true of eye swindlers, so-called Indian doctors and other fly by night quacks.

The Board is very anxious to assist the local authorities in the apprehension of these people. Within the last month the conviction of one of these individuals was secured through the prompt coöperation of a physician who notified the Board by long distance telephone, and it was possible to apprehend the defendant within twenty-four hours. Consequently, the Board would very much appreciate being promptly notified by telephone or telegraph of the presence of any such individuals in any community in this state.

Please call or wire the Minnesota State Board of Medical Examiners, 524 Lowry Medical Arts Building, St. Paul, Minnesota; telephone Cedar 0347.

OBITUARY

Dr. A. E. Voges
1879-1933

Dr. A. E. Voges died at his home at White Bear Lake, Minnesota, on October 21, 1933, at the age of fifty-four.

Dr. Voges was born in Saint Paul and received his medical degree from the University of Minnesota in 1904. He moved to White Bear in 1911, where he had since practiced. At one time he was health officer of White Bear, and for the past fourteen years had been a deputy coroner of Ramsey County. He was a member of the Elks Lodge of Stillwater and was also a Master Mason.

Dr. Voges is survived by his widow, a son, Richard, and a daughter, Dorothy.

Dr. Harold Lauritz Stolpestad
1879-1933

Dr. Harold L. Stolpestad, for many years a practicing physician in the Dayton's Bluff district of Saint Paul, died in his office on East Seventh Street, on October 18, 1933, at the age of fifty-six.

Born in Norway, Dr. Stolpestad came to Saint Paul as an infant and was educated in the public schools of Saint Paul. He received his M.D. degree at the University of Minnesota in 1902 and practiced for several years, following graduation, in Saint Paul before moving to Lafayette, Minnesota. He later returned to Saint Paul where he joined the Ramsey County Medical Society in 1911.

Dr. Stolpestad is survived by his widow and two sons, Dr. Herbert L. Stolpestad and Dr. Armer H. Stolpestad, both of whom graduated from the medical school of the University of Minnesota in June, 1933.

Dr. Frank E. Balcome
1872-1933

Dr. Frank E. Balcome, a practicing physician in Saint Paul for thirty-five years, died at the Midway Hospital on October 21, 1933, following an illness of two weeks.

Born at Delano, Minnesota, in 1872, the son of Dr. Edwin Balcome, he moved to Howard Lake as a boy in 1876. After graduating from Macalester College in 1895 he began the study of medicine at the University of Minnesota and completed the course at the Eclectic Medical Institute of Cincinnati, Ohio, in 1899.

Upon beginning practice in Saint Paul Dr. Balcome soon became associated with Dr. C. M. Cannon at St. Anthony Park, Saint Paul, and continued to practice in Saint Paul until his death, his office in recent years being at University and Snelling Avenues.

Dr. Balcome joined the Ramsey County Medical Society, September 25, 1905, and was thus a member of the Minnesota State Medical Association and the American Medical Association. He was also a Mason and Odd Fellow.

In 1900 Dr. Balcome married Miss Anna M. Lutz of San Francisco. He is survived by his widow, three daughters, Ruth M., Jean W. and Marion Elizabeth, and a son, Milton M. Balcome.

FORTIFICATION OF FOODS OTHER THAN TABLE SALT WITH IODINE OR IODINE COMPOUNDS

The Committee on Foods reports that the fortification of foods other than table salt with iodine or iodine compounds may lead to excessive iodine intake and endanger public health. Foods so fortified, other than table salt, will not be eligible for acceptance. (Jour. A. M. A., August 5, 1933, p. 448.)

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of November will be as follows:

November 1—Hardening of the Arterics.
November 8—Do Germs Cause Disease?
November 15—Sugar Hunger.
November 22—Problems of the Premature Infant.
November 29—History of Cancer.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The forty-first annual meeting of the Southern Minnesota Medical Association was held at New Ulm, September 25, 1933. Turner Hall proved well adapted to the needs of the meeting with its small rooms for demonstrations, lounging room for commercial exhibit, auditorium and basement beer garden.

There were some 179 registrations out of a membership of 400. Professor C. O. Rosendahl and R. V. Ellis of the University, who had received the medal for their scientific exhibit at the State Association meeting, were presented at the luncheon meeting, as was also Dr. Lloyd Whitesell, the recipient of the hundred dollar award to the senior student at the University. The applications of twenty-one new members were accepted.

The officers elected for the coming year were: Dr. M. C. Piper, Rochester, president; Dr. S. A. Slater, Worthington, first vice president; Dr. W. G. Workman, Tracy, second vice president; Dr. H. C. Habein, Rochester, secretary-treasurer.

The next annual meeting will probably be held at Mankato.

STATE MEETING—1934

Preparations are already under way for the 81st Annual Meeting of the Minnesota State Medical Association following the first meeting of the 1933-34 Committee on Scientific Assembly held at the Lowry Hotel in Saint Paul, September 30. The State Meeting is scheduled for July 16, 17 and 18, 1934, in Duluth.

A call for papers on new developments of any sort in medicine has been issued by the committee. Any new moving pictures, demonstrations and exhibits prepared by the members will also be welcomed by the committee in making up the 1934 scientific program.

The general plan for the meeting calls for two mornings of clinical and table demonstrations, Monday and Tuesday, with the afternoons of the same days devoted to papers. Wednesday, according to the present tentative plan, is to be given over to special society programs. The House of Delegates and Council meetings will probably precede the scientific program on Sunday.

The usual Monday night medical economics program will give place to a scientific program, possibly a cancer symposium, if present plans materialize. There will be a banquet Tuesday evening. All sessions of the meeting will be held at the Duluth Hotel and limitations of space will dictate to some extent the character of the program.

The demonstrations which have proved so popular at the last two state meetings will be emphasized again. Prominent among them in 1934 is to be a heart demonstration. Among other subjects under consideration for demonstrations or papers are neurogenic tumors; treatment of cyanide poisoning; agranulocytosis from barbiturates; newer concepts of lead poisoning and toxicology in general; pernicious anemia and treatment of all the anemias that do not respond to liver therapy; malnutrition among children; diabetes; cancer; adrenal surgery; varicose veins; hemorrhoids; fractures; minor surgery; and skin diseases.

Several distinguished out-of-state speakers will be invited to present papers or clinical and table demonstrations.

The 1934 committee is composed of: Section on Medicine: E. T. Herrmann, Saint Paul, chairman; R. E. Nutting, Duluth, secretary; Section on Surgery: W. D. White, Minneapolis, chairman; J. de J. Pemberton, Rochester, secretary; Clinical Demonstrations, W. A. O'Brien, Minneapolis.

The committee will meet again Saturday, November 4, at the Lowry Hotel, the Medical and Surgical Sections meeting at 5 P. M., to be joined by the others for dinner at 6:30.

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

MINOR MALADIES AND THEIR TREATMENT. Leonard Williams, M.D. Sixth Edition. 420 pages. Price, cloth, $3.75. Baltimore: William Wood & Co., 1933.

FOOD, NUTRITION AND HEALTH. E. V. McCollum, Ph.D., Sc.D., and J. Ernestine Becker, M.A. Third Edition rewritten. 146 pages. Price $1.50, cloth. Baltimore, Md.: E. V. McCollum and J. Ernestine Becker, 1933.

INFECTION OF THE HAND. Allen B. Kanavel, M.D., Sc.D. Professor of Surgery, Northwestern University Medical School, etc. 552 pages. Illus. Price, $6.00, cloth. Philadelphia: Lea & Febiger, 1933.

THE TECHNIC OF LOCAL ANESTHESIA. Arthur E. Hertzler, M.D., Professor of Surgery, University of Kansas. Fifth Edition. 292 pages. Illus. Price, $5.00, cloth. St. Louis: C. V. Mosby Company, 1933.

WHEAT, EGG OR MILK FREE DIETS WITH RECIPES AND FOOD LISTS. Ray M. Balyeat, assisted by Elmer M. Rusten and Ralph Nowen. Philadelphia: J. B. Lippincott Co., 1933.

Eggs, wheat and milk have become notorious as causes of allergic reactions. However, being the basis of the ordinary North American diet, they are particularly difficult to avoid. Balyeat has, therefore, prepared this small book consisting mostly of recipes. The recipes apparently are well chosen and successful; in fact the reviewer's cook tried some of them successfully. There is also a short discussion of allergy in general and some of the allergic diseases in particular which seems a little heavy for the ordinary lay reader, and a little light for most doctors. There are tables of weights and blank sheets for dict diaries with reminders of unthought-of occurrences of milk, wheat and eggs. The book seems most useful for dietitians and particularly intelligent patients.

H. B. SWEETSER, JR., M.D.

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XVI DECEMBER, 1933 No. 12

THE MEDICAL PROFESSION *VERSUS* RACKETEERING*

His Excellency, John Gregory Murray
Archbishop of the Diocese of Saint Paul

Saint Paul

ESTEEMED Chairman, Members of the Minnesota Medical Association, Ladies and Gentlemen: The atmosphere in which I am privileged to address you this evening is most wholesome to present the thoughts that I have; for this, a great medical center that is unique in history, so far surpasses all the achievements of medical organization in any other time or in any other country that there is only one incident that comes to my mind as I review the pages of history that seems to approach, to some degree, the organization that you have set here in Rochester. That was the famous city of Basil in Syria, which way back in 380 established a center to which the afflicted of every condition, of every race, of every malady and affliction might have recourse in order to find relief.

Surely, it is a wholesome place for us to meet here in Rochester, which has taken the leadership among all the outstanding centers of medical activity in the world.

I come here in a very happy mood because I appreciate the part that is played by the medical profession in advancing the interests of society at large. Sometimes we think that the medical profession is devoted so exclusively to one particular form of activity that it reserves to itself the disposition to isolate itself somewhat from the every-day activities of humankind. But as we go back through the course of history, we find that the medical profession was intimately associated with the constructive program for the advancement of the race, not only in regard to the giving of physical relief but likewise, as my predecessor on this platform has already said, in the development of a mental relief. In fact, all the various activities of life, whether in the intellectual field or in the moral field or in the physical field, are so interdependent that it is almost impossible for any one particular sphere to be fully developed in a wholesame way without the coöperation of all the activities. So that man finds his happiness in possessing a sound mind and a sound body, for the mind, after all, is the source of thought by which he must direct his moral activities, and both mind and morals are so closely associated with a wholesome physical background that all combine to develop the perfect man.

The reason I am concerned with emphasizing a particular phase of the relationship of a medical society to the human race at large in my remarks this evening is because I realize that the medical profession is so close to the mind and the heart of humanity that it occupies a position of great strategy in our present day when there is a tendency to absorb so completely all the activities of the professions as to make them more or less subject to the disposition of modern government, to dictate to the individual as to how he shall live, as to how he shall develop.

You all know that there are two schools in regard to the view concerning government. There is the school that considers that government should be limited as far as possible to that particular sphere wherein it may protect the individual from being hampered in any way in the perfect development of self.

But there is likewise another school that is disposed to be so paternalistic that it assumes the responsibilities for practically all the activities of the human race; so much so that it is pyramiding upon government the functions of the home,

*Presented before the annual meeting of the Minnesota State Medical Association, Rochester, Minn., May 22, 1933.

the functions of the family, the functions of education, the functions of the professions, so that there is scarcely anything left in the way of responsibility or initiative for the individual. It is that particular trend that gives me very much concern at the present time.

You know that the culture of any nation is determined by its standards of living. Its standards of living have to do not simply with the food that a man eats or the house in which he dwells, but especially concerns the particular intellectual point of view that he has attained and the ethical standards he has adopted, because, after all, those spiritual elements to which the recipient of the medal this evening referred are the essential elements in the development of society.

Of course, if there is a tendency on the part of government to suppress initiative, to eliminate practically any personality in the development of the sciences, in the development of the professions, what seems in the beginning to be perhaps an advantage to the greater number, because of a more equitable distribution of the sources of help and the sources of support, in the latter days tends to the annihilation of that particular individual and personal element that is so essential to culture, so essential to the standards of living and so essential to the welfare of any profession.

You know that a profession, in contra-distinction to any other kind of a vocation in life, tends to the enhancement and the enrichment of the values in society at large and it tends to elevate the race, whereas the individual who seeks after the enrichment of self in a material way is concerned only with self.

Now, of course, in every particular field, no matter what the professional field may have been, there has always been the tendency on the part of certain individuals to enrich themselves in a material way at the cost of the entire group.

We find that way back in the earliest days of medical history, when the great father of medicine, Hippocrates, who was named "the Divine" or "the Great" in contradistinction to six others of the same name, finally organized medical science in such a way that it would be built upon the study of the individual; that instead of simply considering the disease, he undertook to consider the entire man.

After all, that particular essential that he incorporated into medical history way back in 560 B. C. has been the one particular element that has been developed to a greater degree in modern medicine. So that men are not so much concerned about discovering the disease by a process of diagnosis, and then applying a specific remedy, as men are concerned about the prognosis of each particular case by a study of the entity, his morals, his resources, his courage, his fortitude, his spirit of perseverance in the face of difficulties, and then to try to consider the particular need in view of all the circumstances that arise in the case.

While Hippocrates was quite successful in developing certain medical principles that were later on incorporated by his followers into a certain code known as "The Aphorisms of Hippocrates," yet there was always, at the same time, in competition with his school, the school of Cnidus: the school that incorporated into its processes those traditions of Egypt and of certain parts of Asia and India, that tend to a schematization or general development of certain ideas rather on speculative grounds, rather on the supposition that certain things should be so a priori, and, therefore, "we will adopt them, no matter what the outcome may be, whether the patient survives or not." The fact is that the philosophical principles behind this particular procedure have been faithfully observed, and the results, as far as the patient is concerned, are altogether secondary. The school and its background have been maintained, but, of course, the patient, after all, only happened to be a victim of circumstances.

There has always been that tendency of a conflict between the recognition of the facts as discovered by personal research and the presupposition as to what should be discovered by a process of reasoning rather than by a process of observation.

Unfortunately, in the course of time, this excellent foundation laid by Hippocrates was so lost sight of that about the second century after Christ, Galen came along with his theories as to the processes that were speculative in nature; his theories were taken up by the school of Arabian medicine to such an extent, that for upwards of one thousand years the school of Arabian medicine dominated all of Europe, because the Arabs had passed over from Asia into Northern Africa and into Spain and had there set up their center of activity in that particular

part of the world. It required the greatest effort on the part of those who recognized the true procedure in medical science to finally reconstruct the Greek principles, especially in the school of medicine at Salerno in the kingdom of Naples way back in the Twelfth Century. It seemed heretical if you did not accept the standards that had prevailed according to the school of Galen.

It was not until the Fifteenth Century, late in the Fifteenth Century and early in the Sixteenth Century, that the development of humanism, especially under Petrarch, gave an opportunity for men to go back to the sources of true medical history in order that men might not be the victims of mere speculation but might become the beneficiaries of actual observation and research as applied to the individual man.

That particular development of modern medicine has led to the marvelous progress that has been made by the science of medicine in these latter years. Surely, there has been no science in all history that has made as rapid progress as medical science in the last four hundred years, but more particularly in the last four or five decades. Why? Because there were men who were actuated by that love of truth and that support of the welfare of the individual who isolated themselves in their laboratories, from the common round of men and women and opportunities for social enjoyment, in order that they might discover even a grain of truth to add to the great mountain, as was so beautifully expressed by him who received the medal tonight in recognition of his work in the laboratory.

I have developed this particular theme at some length in order to emphasize this truth: That if there is not given to the individual physician and surgeon the opportunity to depend upon his own initiative, to develop his own particular field in the spirit of freedom, with the moral support and with the good will of all those who are interested in the progress of science, there will be a reaction that will be most unfavorable just the same as has occurred in the centuries of the past, simply because men began to speculate as to a better process, or a better method, in order to advance public health and to advance the welfare of medical science.

Of course, the most dangerous condition prevailing today is that, instead of having mere quacks to go around and hoodwink unsuspecting, innocent victims, who, because of the limitations of their practical knowledge, are always disposed to look for a remedy everywhere except where it can be found, instead of the individuals being subjected to the evils of quackery, we find that in the whole field of human activity today there is the tendency on the part of an individual to become the leader of a great group, or a great band, and as they prey they do not look simply for an individual but they look for an entire profession. They look for an entire group that has assumed a position of great responsibility in the world or a position that is quite essential to the economic or the social welfare of the world.

We know just what has happened to all of us who are assembled in this hall tonight, on account of the fact that certain salesmen of high pressure resources succeeded in leading all the bankers of this country out of the field in which they should have exercised the functions of trustees of the people's money, into the speculative field in order to use the people's money to make more money, and, of course, what everyone might anticipate has come upon us. Instead of making more money, they have simply wrecked the whole financial structure.

The same thing is true in regard to other fields. At the present time there are those who undertake to set up a certain scheme, we will say, of education that is so contrary to the acknowledged principles of psychology and of ethics that we are in a great field of experimentation which might have been justified when it is a question of a material problem.

But when you come to the consideration of an intellectual, a spiritual problem, it is absolutely necessary that men should recognize the background of philosophy that has been developed during the course of centuries and not entirely discard what has been the result of learning.

Going outside of the field of finance, outside of the field of education, we have this field of government that has undertaken now to take upon itself so much responsibility for the world at large that the individual has no longer any need to use his brains or to use his sense of responsibility to society at large. What will be the result? Simply there will be the same condition, that will be a catastrophe in character, if we permit government to assume all the responsibilities. Government is essentially organized as a police power. That is the essential

function of government. It is not so much to stimulate the individual to take care of himself, as to protect the individual from any particular other individual or group or circumstances or conditions that might hamper the welfare of the individual.

That is the reason, at the various meetings of the Medical Society, ever since its organization some eighty years ago, that the doctors took counsel with each other as to how they might eliminate the menace that came to society and to the individual. They felt they were justified in using the police power, in order to prevent those who were not qualified or were not actuated by proper motives to pursue the study of medicine. Of course, in that the government has a most essential function to perform.

But, instead of continuing in that particular field, we find now that the tendency is for the government to come in and absorb all the activities of society. The government, you know, is nothing more than a combination of individuals. The government, even though it may represent 100,000,000, does not represent any more wisdom that the wisdom of the wisest man in 100,000,000, and the government doesn't represent any more spirit of sympathy and consideration than you find in any of the individuals that are exercising the powers of government.

If you have had any experience at all, you will discover that the tendency on the part of government is gradually to drift back to its original purpose of simply exercising police power. For instance, the other day one of the most distinguished members of the bar told me how he was to plead a case before the Supreme Court of the United States, and because the ethics of the bar were disregarded by the representative of the government, he was simply outlawed with regard to the time for the presentation of the case, after solemn agreement, and the only recourse he had was, "Well, you must understand you are now dealing with the government." The government, after all, being a mob, is not necessarily subject to the ordinary ethics of human society.

If the government, therefore, proceeds to absorb all these various activities of human society, what will be the result? Instead of maintaining a condition that will be most wholesome for the individual, it tends to the enslavement of the individual, to the degradation of the individual citizen.

It was to get away from a condition like that that the people came to develop this great republic, seeing to it that only a minimum of power should be given to the government, and that the maximum amount of power and resources should be reserved for the individual. All this has led up to the particular point that I want to emphasize tonight, and that is this: There is a movement on foot to establish what is known as state medicine. In other words, there will be, according to the program of those who advocate state medicine, such an ideal condition, such a Utopia, that everybody under heaven is going to receive a maximum of attention from the medical profession for a minimum of expenditures. Of course, in that great Utopian undertaking the most essential element for the success of such a scheme is utterly disregarded, and that is the individual physician, the individual surgeon, who, after all, must be given a field in which he shall not be dominated by powers that are developed by the mob and determined by the mob. Because, while the great mass of humanity may undertake to initiate certain legislation that seems to be beneficial, there are always those in the political field who manipulate all legislation to their own personal advantage. Instead of being statesmen in order to sacrifice themselves for society, they are mere politicians who believe that society exists for their profit, just the same as the quack of the medical profession. Instead of considering that the medical profession is a science in order to advance the welfare of human society, it is nothing more than an opportunity for him to gain a very lucrative living.

On account of those conditions, I feel that the members of the medical associations should unite in an appreciation of what they owe, not only to their own society but what they owe to human society at large; that they will still maintain that position accorded to them by the father of medicine who emphasized the fact that the physician was called, in the plan of society, to serve, and to serve in a field where there could be no material compensation adequate to repay him for his services. In other words, the services of any true professional man cannot be measured in terms of money. The object of the true professional man is to strengthen society, instead of looking out for himself, and his own interests, at the expense of society.

This is especially true because of the sacred relationship that the physician and surgeon must always retain to the individual family. No human being can appreciate the great joy that comes to him who enjoys fatherhood or motherhood, unless one is conscious of having participated in bringing a life into the world. Only secondary to that great achievement and to the joy that it brings is the achievement of those in the medical profession who can preserve the life that comes, and can give of themselves their genius, their skill, their learning, their energy, their very lives, in order to maintain that which is the most precious thing that man has under heaven, the life that gives him the opportunity to work out his destiny, for a life that is still greater and still more wholesome and still more satisfying.

I want to say to those assembled here tonight, I hope everyone, layman as well as members of the medical profession, will see to it that there will be no experiment in government that will tend to subjugate the medical profession, dictate to the medical profession or say to them that they shall become mere hirelings to work for a wage, rather than to be men in their respective professions to receive an honorarium which is only an expression of gratitude by those who receive their service, because they know they cannot repay that service.

MODERN CONCEPTION OF CHRONIC ARTHRITIS*

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THE vast amount of work done recently on the subject of chronic arthritis is in marked contrast to the interest shown prior to ten years ago. Before the International Committee for the Control of Rheumatism was organized there was a lack of interest which is remarkable when one considers the tremendous number of cases and the long duration of suffering, not to mention the great economic loss caused by the chronic arthritides. It was only after a number of European countries instituted state medicine and state health insurance that we became aware of the great percentage of the total illness which was caused by the chronic joint diseases. It has been estimated that from 10 to 20 per cent of all sickness claims made in England are due to chronic rheumatism.[12] When government authorities learned that so large an amount of money was being spent to take care of their patients with chronic arthritis they felt that something should be done to remedy this condition. The result was the formation of the International Committee for the Control of Rheumatism. This committee, of which our American Committee is a part, has been instrumental to a considerable extent in stimulating the recent interest in chronic rheumatism.

In order to follow this recent work intelligently it is necessary first to understand clearly the nomenclature used. The classification of the chronic joint diseases is still so confused that it is imperative that the specific type of arthritis under discussion be clearly defined. A review of the past history of the attempts of classification of the arthritides is tempting and would be of considerable interest but does not seem to fall within the scope of this paper. It need only be stated that numerous titles and subtitles were used in different countries. A student of this disease in one part of the world was never sure exactly what type of arthritis was under discussion either in this country or in any other country. It would appear that every worker in this field would eventually devise a classification of his own. When Virchow brought out the term, arthritis deformans, it added nothing but confusion to an already confused field. Now it has been agreed by almost everyone that the term, arthritis deformans, be dropped entirely. It adds nothing to the clarity of the subject.

It remained then for the English to discover finally that all types of chronic joint disease tend to fall into two main groups. These were labeled by Garrod,[11] rheumatoid and osteoarthritis. This grouping tended to clear up the subject to a great extent and has resulted in considerable advance in the study of arthritis. It is my purpose then to discuss the types of chronic joint disease

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which come under the general heading of rheumatoid and osteoarthritis. It is purposed to exclude tuberculous arthritis for the reason that this is a specific disease and the pathology is quite characteristic. Rheumatic fever is also excluded but the relationship between rheumatic fever and chronic arthritis will be discussed later. Neither am I going to discuss the type of chronic rheumatism known as fibrositis, which includes a variety of diseases such as lumbago, myositis, muscular rheumatism and so forth.

PATHOLOGIC DIFFERENCES

When the American Committee for the Control of Rheumatism began their investigations it was necessary to decide upon a particular classification. Members of this committee were well aware of the difficulty with the nomenclature and after study decided on the use of the classification which was proposed by Nichols and Richardson,[15] namely, proliferative and degenerative arthritis. These are synonymous with the English rheumatoid and osteoarthritis, respectively. More than twenty years ago Nichols and Richardson reported their study of some sixty-five cases of chronic arthritis. This treatise is probably the most thorough pathologic research ever done on this subject and their conclusions have recently been confirmed by Allison and Ghormley.[1] After spending eight years on this pathologic study, Nichols and Richardson felt that they could again divide all of their cases into two main groups and it becomes necessary to discuss their findings somewhat in detail. The authors stressed the point that the cases of the two main groups were not necessarily of different etiology; in fact, there was considerable overlapping from the etiological point of view. Nichols and Richardson emphasized that a certain pathological alteration of a joint may be the result of a variety of irritants or agents and a given irritant or agent may produce a variety of pathologic changes. Trauma, acute suppurative infection, gonorrhea, syphilis, and other probable factors may induce primary proliferation of the synovial membrane; while old age, trauma, bone tumor, gout, diseases of the central nervous system and other causes may lead to primary degeneration of the cartilage. Nichols and Richardson thus included under proliferative arthritis various types of specific and nonspecific arthritides. It is important to bear in mind this definite contribution of Nichols and Richardson; namely, that a variety of causes may produce the same gross and histologic changes and one etiologic factor result in a variety of pathologic pictures. Many writers have adopted a different usage, applying the term "proliferative arthritis" to designate nonspecific disease only and describing all specific infections separately. Pathologically, Nichols and Richardson did not differentiate a gonorrheal or staphylococcic joint from nonspecific arthritis; all were proliferative arthritides. Nor were they able to differentiate between degenerative arthritis secondary to trauma, syphilis or senile changes. This same excellent treatise also brought out the fact that a proliferative arthritis, if it continued sufficiently long, might develop changes characteristic of the degenerative type, particularly osseous hypertrophy. In one and the same patient, at the same time, one may find one joint with typical degenerative changes and another showing definite proliferative changes.

The proliferative process, which was found to be of sufficient importance to form the basis for a classification, commonly begins in the synovial membrane and it is necessary to remember that the term "proliferative" always does, or at least always should, refer to synovial proliferation. A pannus-like membrane of granulation tissue is the result of the proliferative process; this membrane spreads over the joint cartilage. Wherever the pannus comes in contact with the cartilage it produces erosion and destruction. At the same time a reaction is stimulated in the perichondrium, which starts to proliferate, developing new cartilage and even new bone. Thus several processes are in progress: synovial proliferation, destruction of the cartilage, and formation of new cartilage and new bone. There may be also a proliferative process in the subcartilaginous endosteum invading the joint cartilage, which thus is being destroyed from both above and below. The epiphyseal bone marrow shows an increase in connective tissue and increased vascularity. There may or may not be an epiphyseal diminution of the bone trabeculæ. The decrease in epiphyseal bone tissue on the roentgen film gives an atrophic appearance and explains the x-ray name for this type of arthritis: atrophic arthritis. Fibrous adhesions occur early and often become extensive, producing a multiloculated joint, leading to further bone atrophy. In advanced cases the joint may be entirely destroyed and the adjacent bones fused together

TABLE I. CLINICAL DIFFERENCES BETWEEN PROLIFERATIVE AND DEGENERATIVE ARTHRITIS

	Proliferative	Degenerative
Onset	Acute or subacute	Insidious, chronic
Age group	Younger: 20-40	Older: 40-60
Type of joint	Increased fluid with fusiform swelling	Usually dry with general diffuse enlargement. Crepitus often occurs.
Sex	Three times as common in females	Slightly more common in males
Joints affected	Smaller joints of hands and feet first. Often symmetrical involvement of joints: wrists, knees, ankles. Spine and jaw joint often involved.	More common monarticular: hip joint, shoulder. Not symmetrical.
Muscular wasting	Marked	Not prominent
Pain	Usually marked	Usually not marked, although very variable
Limitation of motion and deformity	Early and marked. Ankylosis early: fibrous or osseous.	Usually comes on after years. Not real ankylosis; limitation often due to exostosis.
Vasomotor phenomena	Often precedes actual development of arthritis. Raynaud's disease: cold hands, increased sweating.	Arteriosclerosis common
Constitutional symptoms	May be marked	Usually not marked

with a continuous marrow cavity. Subluxations and dislocations are frequent in proliferative arthritis. Effusion into the joint cavity together with articular and periarticular swelling produces the characteristic fusiform joint of this type of arthritis.

Degenerative arthritis, on the other hand, is characterized by fibrillation and degeneration of the joint cartilage, especially in its central portion, together with an overgrowth of bone at the edges of the joint. As the name indicates, this is primarily a senile degenerative process with little evidence of inflammation. Ankylosis or adhesions do not occur although there may be locking of the joint due to exostosis.

CLINICAL DIFFERENCES

Clinically these types may be differentiated in the manner shown in Table I.

ROENTGEN DIFFERENCES

The roentgen examination of the joints gives a fairly good picture of the inherent pathology of chronic arthritis. In most instances a fairly clear cut differential diagnosis between proliferative and degenerative arthritis can be made with the use of the x-ray. As has been stated there is more or less overlapping between these two main groups and occasionally a patient will be seen with joints of both types. Especially is this true of those people with proliferative arthritis who have had the disease for many years. Some of these long infected joints may eventually develop degenerative changes. It is also well to call attention to the fact that early in the disease even in the presence of considerable pain, the x-ray studies of the joint may be entirely negative. Proliferative arthritis is diagnosed by atrophy of the bone and soft tissue, destruction of the bone and cartilage and fibrotic or even bony ankylosis. Any or all of these findings may occur in the proliferative type.

Degenerative arthritis, on the other hand, is characterized in the x-ray film by an overgrowth of new bone, especially at the margins of the joints and occasionally by eburnation of bone with no evidence of bone atrophy and no destruction of bone or cartilage and no ankylosis. The x-ray changes may occur a few months after the inception of the disease or only after many years of activity.

PREDISPOSING CAUSES

There are many predisposing causes in chronic arthritis; this is especially true in the proliferative type. The underweight, visceroptotic young

women who commonly develop arthritis, appear to have an hereditary constitutional weakness. They are prone to have many foci of infection, they suffer from chronic fatigue, and they have poor circulatory control. Long continued fatigue, severe emotional strain are conducive to the development of proliferative arthritis. In some instances an injury to one joint may be the beginning of a severe generalized arthritis. Degenerative arthritis occurs more commonly in the overweight, apparently healthy individual, who has a tendency toward arteriosclerosis. Often this type appears at the time of menopause. Chronic arthritis is much more common in the temperate climates and is practically unknown either in the tropics or among the Eskimos.

There is evidence that some forms are due to endocrine disturbance but our knowledge of the endocrines is still too fragmentary to enable any authoritative opinion. A low metabolic rate, especially in women, with arthritis is not uncommon and for that reason small doses of thyroid have been given with more or less evidence of improvement. For many years a number of students of this disease have stressed the importance of dietary and bowel disturbances as a prominent cause of the chronic joint diseases. Pemberton[16] especially has felt that overindulgence in concentrated carbohydrates is an important factor in the cause of arthritis. Many patients have chronic constipation and a number of detailed x-ray studies tend to show frequent malformations of the large bowel. This has led to the persistent use of high colonic flushing with variable results.

DIFFERENCES BETWEEN RHEUMATIC FEVER AND RHEUMATOID ARTHRITIS

Because some investigators have found streptococci in the blood of patients with rheumatic fever as well as in others with proliferative and degenerative arthritis, they have concluded that all these rheumatic conditions are all one and the same infection, the clinical differences being explained on an age difference. That is, when a child develops rheumatism rheumatic fever is the result; while a young adult develops rheumatoid arthritis and an older person, the degenerative type. These workers also point out the similarity between rheumatic fever and rheumatoid arthritis in that subcutaneous nodules are found in both of them. While it is true that these two types of rheumatism do have these similarities there are so many distinctive differences that it seems advisable to keep our clinical classification and not throw all these clinical identities into one jumble. Most investigators are agreed that degenerative arthritis can be taken out of the infectious classification as it presents none of the clinical or pathological characteristics of an infectious disease. In comparing rheumatic fever with rheumatoid arthritis it is well to note that rheumatic fever is distinctly a disease of early childhood, the peak of incidence occurring in Minnesota at the age of six, while rheumatoid arthritis occurs more commonly in early adulthood. Cardiac involvement of a permanent nature occurs in sixty per cent of patients with rheumatic fever and occurs rarely in rheumatoid arthritis. Rheumatic fever is usually a much more acute disease but never leaves any permanent changes in the joints. Occasionally rheumatoid arthritis has a rather acute onset and in the early stage of the disease it is sometimes difficult to differentiate between an attack of rheumatic fever and the acute onset of rheumatoid arthritis. Careful clinical observation should in most instances overcome any difficulties in differential diagnosis. An attack of acute migrating polyarthritis appearing in a patient over twenty years of age, especially when this is the first attack, should immediately arouse suspicion that the case may be one of rheumatoid arthritis. Furthermore, the patient with an acute onset of rheumatoid arthritis frequently has involvement of the mandibular, cervical spine and the sterno-costal joints and these joints are not commonly involved in rheumatic fever. And more important still, these acute proliferative cases are usually left with one or more joints permanently involved while in rheumatic fever the joints, even though they may be more acute for a continued period of time, never develop permanent changes. Occasionally in a rare instance the involved joints following rheumatic fever fail to clear up for a period of months but in every case that has come under my observation the recovery has been complete and no permanent joint changes resulted. I have had the opportunity of studying several hundred cases of rheumatic fever over the past twelve years and amongst these cases I have observed three children who had protracted joint swelling which lasted in one case over a year; in all three of

these children the joints have completely cleared. In following these children from childhood into early adulthood I have not seen a single instance where a patient has developed chronic arthritis directly following rheumatic fever. If these two diseases were the same, one would expect to see at least an occasional case show such a gradual development from rheumatic fever to chronic arthritis. Furthermore, it has been shown that in some countries, as in Holland, chronic arthritis occurs quite commonly while rheumatic fever is relatively rare. One would expect a more equal distribution in these two diseases, were they the same. Certainly from a clinical point of view rheumatic fever is a distinct entity and should not be considered the same disease as rheumatoid arthritis.

The bacteriological study of chronic arthritis is progressing with intense interest in many parts of the world at the present time. A number of reports appearing recently have been very enthusiastic. Some investigators have reported a specific organism which they are sure causes atrophic arthritis; others have said that there is no specific organism but that many types of bacteria, especially the streptococcus, may cause the disease. The finding of staphylococcus has also been reported by others as the cause of most of their cases. A decided difference of opinion exists as to which types of arthritis are infectious and which are not. A few students of rheumatism are of the opinion that all types of arthritis from rheumatic fever to osteoarthritis are caused by the streptococcus. Many workers disagree with this opinion and a good deal of work has been done to show the differences between the two main types of chronic arthritis. Clawson[20] was able to find about 50 per cent positive blood cultures in all types of arthritis while practically all others find a higher or lower number of positive cultures in proliferative arthritis but a very small percentage or no positives in the degenerative cases.

The agglutination titre of the serum and the sedimentation rate[10, 19] of the red blood cells has also been used in the differential diagnosis and it has been found that the agglutination titre is much higher in the proliferative type and the sedimentation rate is much more rapid than in degenerative arthritis. There is decided disagreement on every phase of this subject.

THE BASIS FOR THE USE OF STREPTOCOCCUS VACCINE

The use of streptococcus vaccine in the treatment of chronic arthritis and other types of rheumatism is not new. Small doses of vaccine subcutaneously over prolonged periods of time have been used for twenty years or more. Recently as a result of a large amount of experimental work the intravenous method has been preferred to the subcutaneous route of administration of the vaccine.[5, 17] It has been shown that animals could be made hypersensitive or allergic by subcutaneous administration of vaccine and that this method of treatment probably did more harm than good. It was further shown that animals could be desensitized by giving the vaccine intravenously and this method has become popular in many clinics. Not all workers are agreed on this phase of the subject and some investigators are still using the subcutaneous method, using very minute doses of vaccine.

The use of streptococcus vaccine is based on the following three premises:

1. That chronic arthritis is caused by either a specific type of streptococcus or at least by various strains of streptococci.

2. That the agglutination reaction is a specific one and that the increase in agglutination titre indicates an increased immunity to the disease.

3. That a subjective symptom, like the relief of pain, can be accepted as a therapeutic index in such a disease as chronic arthritis.

It is well to consider these premises somewhat in detail. This is, as you notice, a most involved and controversial subject and I hope my brief discussion will not further confuse you. A study of the most recent literature shows anything but agreement as to whether or not the streptococcus is the actual cause of chronic arthritis. Such excellent investigators as Cecil[4] and his co-workers, and Clawson have been able to obtain from 50 to 80 per cent positive blood cultures in their cases. Recently various others have been able to repeat this work. On the other hand, equally good workers including Dawson,[8] Hench,[3] Coburn[6] and Cooley[7] (working with cases of acute rheumatic fever where one would expect to find the highest incidence of positive cultures) have been able to find no organisms even after painstaking and exhaustive work. In my own experi-

ence, I have been unable to find any organisms in blood cultures from thirty cases of subacute rheumatic fever in children and in collaboration with Dr. Luther C. Fisher, Jr., in twenty cases of chronic arthritis in adults. If one were to place the positive reports in the most recent literature against the negative reports it seems quite possible that the reports would balance. As to whether the streptococcus appears in the blood in chronic arthritis one is at liberty to take his choice from the various articles in the literature. This work has been done in the best of institutions by our most expert bacteriologists. Granted for the moment that the streptococcus does appear in the blood, is this a primary infection or does the streptococcus appear only as a secondary invader? There is a good deal of evidence substantiating the latter point of view. For instance, it is known that proliferative arthritis not uncommonly occurs as a result of various debilitating diseases such as typhoid fever, bacillary dysentery and many other prolonged infectious conditions. It is reasonable to suppose that such cases are probably due to secondary infection. Lichtman and Gross[14] recently reported the result of their study of over five thousand blood cultures carried on over a period of five years. This excellent report gives considerable weight to the idea that the streptococcus might easily be a secondary invader. They were able to show that the percentage of positive blood cultures in their cases of various types of rheumatism was approximately the same as the percentage of positive cultures in such conditions as aplastic anemia, pernicious anemia, leukemia, colitis, meningococcus meningitis, pyelitis and pyelonephritis. They conclude that the finding of the streptococcus in the blood in rheumatism in general and in any of the mentioned diseases can be explained as a transient invasion of the blood with the streptococcus and "these organisms can not justifiably be considered as the causative agent of these diseases." One can conclude, therefore, that the streptococcus nor any other organism has been proven to be the specific cause of chronic arthritis and that its presence in the blood stream may be explained as a secondary invasion or a transient manifestation.

THE AGGLUTINATION REACTION OF THE BLOOD IN ARTHRITIS

The agglutination reaction has been used to identify specific strains of streptococci and as an index of therapeutic improvement; that is, it has been claimed that patients that showed an increase in agglutination titre as a result of intravenous vaccination showed clinical improvement. The agglutination reaction is technically difficult to study and conclusions drawn from its use have been in many instances too hasty. One need only read the monograph of Andrews and Christic[2] on their attempts to classify the streptococci to understand the extreme difficulty which this problem presents. After seven years of work these investigators concluded "the more one studies the hemolytic streptococci, the more strongly is the impression gained that they are in a state of constant flux in which it is difficult to find any firm foundation for a permanent classification."

These workers showed that there were almost insurmountable difficulties with the agglutination test; they also point out that different investigators are using different methods of agglutination and it is impossible to draw conclusions from such reports. Tillett and Abernathy[18] recently showed that with their method they obtained equally high titres from blood obtained in various diseases such as pneumonia, undulant fever, and tuberculosis as from blood of patients with chronic arthritis. Keefer[13] and his co-workers, on the other hand, recently showed that with their method the titre was much higher in arthritis than in any other disease. From all these contradictory reports I believe it is fair to conclude with Dawson and his co-workers that "the significance of the agglutination reaction in rheumatoid arthritis serum is largely a matter of conjecture."[9]

It is a well known fact that chronic arthritis of the proliferative type is characterized by exacerbations and many cases clear up spontaneously. To accept a symptom like the relief of pain as an indication of therapeutic effectiveness of a specific nature seems hardly reasonable. Many drugs, as well as various nonspecific foreign proteids, are equally effective in this regard. Furthermore, it is well to point out that many cases of chronic arthritis are treated with vaccine over long periods of time and it is fair to assume that at least a good percentage of such patients would probably have received equally good results without the vaccine treatment. The most enthusiastic reporters have as yet given us no follow-up reports after a period of three or four years from

the first introduction of their vaccine, and until such reports appear no opinion can be given as to the efficacy of streptococcus vaccine in the treatment of proliferative arthritis. I have had occasion to use such vaccine in about fifty cases of chronic arthritis. I can not say that the results have been striking. In an occasional case it appeared that considerable progress was being made but for the most part the results were negative. Psycho-therapy in a chronic, long-continued disease like chronic arthritis is very effective in the hands of a physician with the proper personality and some of the favorable results from vaccine treatment may be on this basis. As to the reports that 80 per cent of patients obtain improvement from vaccine, one need only review the older literature and he will find equally favorable results reported from the use of injections of sulphur and a host of other therapeutic measures. It seems fair to conclude that streptococcus vaccine in the treatment of proliferative arthritis has not been proven of specific nature, that results from its use are not startling, and that it has not been used for a long enough period of time in a well-controlled series of cases to determine its value. Anna Williams[21] in her recent monograph on "Streptococci in Health and Disease" has concluded her chapter on the streptococci in rheumatism as follows:

"The question as to how far the use of vaccine or serums or both can be expected to do any good in any of these conditions is still to a large extent unanswered.

"In regard to vaccine in cases of chronic infectious arthritis where they might be supposed to do most good, we seem only to have touched on the effect of allergy in regulating the dosage, and in choosing the best strains of cocci to use in preparing the vaccines. In those cases proved to have streptococci in the blood the various antiserums so far tried have given usually negative or unsatisfactory results."

Most investigators are agreed that degenerative arthritis is probably not of infective origin. Clinically and pathologically this type of arthritis does not present the characteristics of a disease due to infection. Here again the problem of endocrine disturbances is presented. No definite information has as yet been developed along this line. As was stated previously, women commonly develop osteoarthritis in a knee or hip joint at the menopause. The relationship between ovarian degeneration and osteoarthritis is not known. Chronic irritation due to accident does, however, appear to be a prominent factor in the development of degenerative arthritis. Not uncommonly this type of arthritis develops after a fracture into a joint. Men in industry who use one particular joint unusually hard, as in pushing a lever with one foot develop osteoarthritis in that joint. Patients who develop osteoarthritis in the knees and hips are usually overweight and it is believed that constant pressure on these joints due to the increased weight is a factor in the development of the joint disease. Fisher in his recent excellent book on arthritis has shown that animals develop osteoarthritis after introduction of a foreign body, such as a metal shot, into the joint. It is also known that men who do unusually hard work, such as heavy lifting, develop osteoarthritis of the spine. Injury to the joint, whether acute or chronic, is probably a prominent causal factor in degenerative arthritis.

TREATMENT

The joint symptoms in proliferative arthritis must be considered as an external manifestation of a generalized disease. With this idea in mind it becomes necessary then in the beginning to treat the entire patient and not limit our therapeutic endeavors merely to what we can see in the joints. Anemia, undernourishment, visceroptosis, faulty eating habits, habitual constipation, faulty posture, vasomotor instability, all these things are common in atrophic arthritis and need active treatment. You will note that I place these factors ahead of foci of infection; not that I think it is not important to treat all foci of infection, but that I do believe it is more important in the early treatment of these patients to improve by every possible method their general health. For every case that is benefited by the removal of foci of infection many more are not changed in the least and others are made definitely worse by the drastic removal of teeth, tonsils, gallbladders and what-not. The removal of such foci of infection is especially dangerous in these patients before their resistance is improved. It is necessary early in the disease to obtain as far as possible physical and mental rest; and this means, in the most severe cases, bed rest. Having put a patient with proliferative arthritis to bed does not mean completely forgetting about the state of the joints and muscles. Various physio-

therapeutic measures, including massage, radiant heat, diathermy, hydrotherapy, ultra-violet radiation can be profitably utilized during this period. It is my impression that for the most part this form of therapy has been neglected in this country. When one visits the numerous spas and health resorts in England and the Continent and notes the elaborate institutions for utilizing the many physio-therapeutic measures which have been perfected, it is realized that we in this country have fallen behind in this respect. It is probably for this reason that so many of our rheumatic patients at one time or another fall into the hands of quacks who in many instances are far It may be true that chronic arthritis is not cured completely in these elaborate European institutions, but as one of the workers in such an institution remarked to me, "We do keep them comfortable and at work." In some instances it is necessary to order a change of environment for the nervous type of arthritic, but for the most part chronic arthritis can be effectively treated by the general practitoner.

In attempting to improve the general health of these patients the diet is important. Pemberton, as was stated previously, believes that they should be placed on a low caloric, low carbohydrate, high vitamin diet but it is my impression that most clinicians are using a rather high caloric, high vitamin, easily digested diet; especially in those patients who are underweight. It is rather important to obtain proper bowel action by whatever means seems advisable in the individual case. The use of cod liver oil and viosterol, iron for anemia and small doses of insulin to increase the appetite are of value where indicated.

Throughout the treatment the patient should be kept free from pain by the use of the numerous drugs which are used for this purpose. It is not necessary to enumerate the long list of drugs used to kill pain in arthritis; some use one, some another, with varying results, depending upon the patient and the doctor. It is well, however, to use these drugs in adequate dosage to obtain the desired effect—a dose sometimes much higher than the official one. Foreign proteins have proven very effective in the hands of many clinicians. Milk, peptone, various bacterial proteins, and especially typhoid vaccine, prove of value in many instances. Typhoid vaccine is most commonly given at present intravenously and in sufficent dosage to produce a marked chill and fever. This type of treatment can be used over a period of time but only in those patients who are fairly robust and who respond well. A greatly weakened and debilitated patient should not be given this treatment. It is well to remember that a few deaths have been reported following the use of typhoid vaccine. Most clinicians have obtained very favorable results following the careful use of typhoid vaccine given intravenously.

Streptococcus vaccine is being used extensively in the treatment of rheumatoid arthritis at the present time. Its use is indicated only as an adjuvant and not as the sole treatment. It should be administered intravenously and in small doses and in my opinion is not indicated in older people. It is considerably more important to treat the general condition of the patient than to hope for a cure-all in vaccine treatment of any kind. It is also my impression that autogenous streptococcus vaccine is impractical for the most part and equally good results can be expected from stock vaccine.

Returning again to the question of the removal of foci of infection, it is well to note that the radical removal of these foci is indicated in the earliest stages of the disease when the general health of the patient is not too impaired. Little can be hoped for in the removal of various organs of the body in patients who have had the disease for years. These people have adjusted themselves to their infected foci and in many instances, as was stated before, their condition is made worse by the drastic operative procedures which have been so prevalent in the past.

Fibrous or bony ankylosis is common in proliferative arthritis and for this reason it is most important that deformities be prevented. With the patient in bed in the acute stage of the disease the joints should be kept in the optimum position in case ankylosis does develop. It is deplorable to see these patients appear in a University Hospital with their joints "frozen" and in a helpless condition due mostly to neglect. Even in an extensive case with marked involvement of many joints, the difference between a morbid, depressed, hopeless individual and one who still has an interest in life may be only enough motion in the knees and arms to permit walking with the aid of a cane or crutch and to enable him to feed himself and make his own toilet.

In the far advanced cases with marked defor-

mity, orthopedic consultation is necessary and every effort should be made to so liberate some of the joints that the patient is not completely helpless. Orthopedic surgeons who are skilled in the reconstruction of joints often obtain remarkable results in apparently hopeless cases.

What has been said under the treatment of atrophic arthritis in the treatment of the entire patient is equally true in the treatment of hypertrophic arthritis. It is necessary to treat whatever symptoms present themselves. Anemia, constipation, obesity (which is common in degenerative arthritis) need to be treated. Mental rest and removal of all sources of irritation as far as possible should be obtained. All sources of chronic injury to the joint need to be removed. This may in some instances necessitate a change of occupation where the particular joint is involved due to overwork. Obesity also acts as a chronic source of injury, especially to the weight-bearing joints, and in these cases the overweight needs to be actively treated by diet and the use of desiccated thyroid where indicated. As stated under the treatment of proliferative arthritis, the patient should be kept free from pain by the aid of analgesic drugs. In many cases all that is necessary is to put these hypertrophic joints to rest for a week or two and the symptoms disappear. In this type of arthritis ankylosis and deformities need not be considered as they do not occur. Surgery is contraindicated in these older patients, excepting for the possible removal of a loose joint body which may be causing trouble. Vaccines and large doses of foreign proteid should be used with the greatest caution in osteoarthritis and preferably not at all. With the use of rest and various form of physiotherapy to increase the circulation to the joints and to allay pain, these older people with a painful shoulder, hip or knee can be kept quite comfortable. They should be reassured that the prognosis is good and that no chronic deformity will develop. Such reassurance itself will many times overcome most of the suffering. The drastic removal of foci of infection in osteoarthritis is not indicated as this is probably not an infectious disease.

DISCUSSION

I have tried, as briefly as I could, to indicate that all types of non-tuberculous arthritis tend to fall into two main groups which have been labeled proliferative and degenerative. In the present state of knowledge it is unwise to be dogmatic about any phase of this subject. It is not definitely known whether or not the streptococcus is the cause of any or all types of nonspecific arthritis. We do know, however, that the proliferative type presents the picture of an infectious disease, both clinically and pathologically, but that the degenerative form of arthritis appears from the same points of view to be noninfectious. These two main types present quite definite differences in their onset, predisposing causes, x-ray changes and prognosis. Because of these inherent differences, it is necessary to treat them differently, always remembering that there is more or less overlapping between the two groups. I have also tried to stress the importance of treating the whole patient primarily as well as treating the joints locally. Certain advances have been made in the study of arthritis and more are sure to come, but while we await these new discoveries it is important that we give our arthritic patient the advantage of all the knowledge we already have. The majority of arthritic patients can be kept comfortable, deformities can be prevented, and the development of permanent invalids avoided. We need to change our entire outlook on this subject and take a more optimistic point of view.

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GENERAL MANAGEMENT OF TUBERCULOSIS*

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THE general management of tuberculosis includes a thorough study of the entire body as well as treatment of the tuberculosis itself. The study of the entire body is necessary because the body in which the tuberculosis exists is subject to the same ills as any human body. Correcting these non-tuberculous ills will reduce the load the consumptive has to carry and consequently increase his chances for recovery.

With these general remarks about the advisability of a complete medical study of tuberculous patients, let us proceed with the discussion of the treatment of tuberculosis itself which centers about rest of the diseased part. This may be obtained in the form of general rest or bed rest or in the form of localized rest or collapse therapy or it may be, and usually is, a combination of the two.

The treatment of tuberculosis as it is carried out today is the outgrowth of methods suggested by Herman Brehmer,[2] who believed that tuberculosis was due to a muscular defect in that the heart was too small or too weak to supply the lungs with proper nourishment. His treatment, which was directed towards correcting the supposed cause, consisted of measures to strengthen the heart and improve the nutrition and strength of the body. He believed that fatigue interfered with the recovery and so each patient was put to bed during periods of toxemia. After the toxemia had disappeared he believed enough rest could be secured through the proper combination of rest and exercise. To accomplish this he built his sanatorium in the valley so that the last part of the patient's walk would be down hill as this is less fatiguing than walking up hill. He surrounded the sanatorium with a beautiful park and placed benches every twenty steps so that his patients could rest frequently and thus avoid fatigue.

Dettweiler, Brehmer's assistant, believed that the consumptive needed more rest than he could obtain in this manner and when he opened his Sanatorium in Falkenstein, Germany, in 1874, he added resting in a cure-chair in the fresh air to Brehmer's therapy.

Trudeau,[5] in a paper presented before the American College of Physicians in 1900, called attention to the amount of rest the surgeon used in the treatment of tuberculosis of the joint and

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to Murphy's proposed artificial pneumothorax as evidence of the value of rest. However, from closing remarks it is apparent that Trudeau believed bed rest was necessary during periods of toxemia only and that after the toxemia had disappeared the degree of rest should be guided by the symptoms. This was in accord with the best treatment of that day and apparently was aimed at the control of two symptoms, namely, loss of weight and strength, and the belief that when these were corrected the individual was well. This might be called the symptomatic or the ambulant treatment, and is still employed by some physicians.

Pratt,[5] in a paper before the National Tuberculosis Association in 1907, was, I believe, the first to suggest the use of prolonged bed rest in the absence of toxemia and in 1918[6] he wrote, "It takes a long time for scar tissue to form. Hence, according to the severity and extent of the disease months and years must elapse after the development of a fresh tuberculous process before pulmonary exercise can be undertaken without danger." The soundness of his ideas was well demonstrated when we began to take serial x-rays which gave visible proof: (1) that the symptoms of toxemia could subside and the individual could regain all of his lost weight without much if any change occurring in the tuberculous process; (2) that healing, whether it be by resolution or fibrosis, is enhanced by rest and retarded by exercise; (3) that relapses were much more likely to occur while the healing was going on than after the lesion had become stabilized.

These facts indicate that if those conditions which favored healing of the diseased area were continued until that healing had ceased or until the lesion had become stabilized, then relapses would be less frequent. They also indicate that the chances for recovery are greater if the treatment is directed towards the control of the pathological process than if it is directed towards the control of the symptoms. With this shift in the emphasis of the treatment has come about a different conception of what is meant by rest, of when it is indicated, how intensive it should be and how long it should be used, so that whatever advances have been made in the treatment of tuberculosis itself in the last thirty years have been made through the use of rest therapy.

What is meant by rest and when is it indicated? This varies with the individual physician. Nearly every one agrees that rest means bed rest during periods of toxemia. However, some believe that when the toxemia disappears bed rest is no longer necessary and all that rest means then is merely keeping the physical activities below the fatigue level. Under such a plan, of course, the individual is not to work but he can loaf around the house doing about as he pleases as long as he does not become tired. Such physicians are still following the plan of treatment outlined by Brehmer in the middle of the last century. Others believe that as healing occurs more rapidly under conditions of rest than it does under even modified exercise, bed rest is indicated at the beginning of the treatment for every patient, minimal or advanced, toxic or non-toxic. This is a general rule and of course must be subject to modification. For instance, repeaters and old chronic cases of fibroid tuberculosis where there is little or no chance of recovery, where the problem is a public health one rather than a medical one, can be given more liberties.

How intensive should bed rest be? This will vary with each patient and so any plan of bed rest should be elastic enough to permit of individualization and modification.

It is impossible to state definitely just how long a patient will be held in each group (Table I). Depending upon the age of the patient, the extent and character of the lesion, the symptoms and changes in the lesion as determined by x-ray films repeated every four months, the patient is either held in the same group or is advanced to the next.

According to the above mentioned table, bed rest is divided into three groups, intensive bed rest, strict bed rest and regular bed rest. Each patient receives intensive bed rest at the beginning of treatment and as his condition improves he is allowed a little more freedom until he is receiving regular bed rest.[3] This is the type of bed rest used for the non-toxic patient who is waiting for his lesion to become stationary. These patients feel well, sit up in bed, read, write, do occupational therapy or vocational training but are always cautioned to remember that mental activity is exercise and therefore that it should be kept below the fatigue level.

How long should bed rest be continued? That is one of the most disputed points in tuberculosis

TABLE I—CLASSIFICATION OF BED REST
Glen Lake Sanatorium

ACTIVITIES	INTENSIVE (1)	STRICT (2)	REGULAR (3)
Sit up in bed for meals and other purposes	No	No	Yes
Meals	May or may not feed himself lying on side after food has been cut	Feed himself lying on side	Feed himself sitting up
To x-ray, lamp or treatment room	Only in the bed	Only in the bed or on a litter	In wheel chair
Occupational therapy, reading, writing, etc.	No O.T. work. No writing. Certain patients may read if bookrest is used	Yes, while on side or lying down	Yes, sitting up in bed
Type of disease	Toxic-febrile Caseous non-febrile Certain patients with far advanced cavity formation who are non-operable	Non-toxic fibro-caseous lesion More extensive fibroid lesion Patients from group (1) who have improved sufficiently to stand more freedom in bed	Non-toxic fibroid lesion. Patients from groups (1) and (2) with long-standing lesions of any degree who have shown sufficient improvement

therapy. Some physicians believe that it should be discontinued as soon as symptoms of toxemia have disappeared. Others believe that it should be used for a definite period of time, say six weeks or even six months. Others, including ourselves, believe that each patient presents an individual problem and that the results to be expected from bed rest should determine how long bed rest is to be used rather than any definite fixed period of time. Therefore if one wishes merely a subsidence of symptoms and a quiescence of disease, bed rest need not be as prolonged as when one wishes as complete an investment of the tuberculous process as bed rest can produce. In any event as long as the patient is improving as determined by serial x-rays we see no reason for changing the treatment until the desired results have been secured or until it is apparent that bed rest will not produce the desired results except after years of treatment.

This standard of continuing bed rest as long as the patient is improving under bed rest is the result of the gradual evolution of our ideas concerning the value of bed rest and was first suggested to us by the writings of Pratt. At first we kept patients in bed only a few days after symptoms had subsided, then this was increased to two weeks, then to six weeks and then to a period twice as long as they had had fever. The next step was to twice as long as they had had either fever or increased pulse rate after carefully excluding any other factor which might have caused the rapid pulse. The last step was our present plan. We believe that the standard which the surgeon applies in the treatment of bone and joint tuberculosis, namely, fixation until ankylosis or healing ceases, applies just as aptly to tuberculosis of the lung. Furthermore, there is general agreement that pneumothorax which produces a much more complete rest of the diseased lung than does bed rest should be carried out on the average for three or four years. If such rigid standards are necessary where complete rest of the diseased lung can be obtained, then certainly the standard outlined above where only relative rest is used is none too strict. Certainly the length of time that localized rest is deemed necessary is one of the best arguments for prolonged bed rest. Under this standard then of no change in the treatment as long as the lesion is improving under bed rest as is determined by serial x-rays, the duration of bed rest will vary with each individual patient. Patients with early lesions require a much shorter period of bed rest than those with advanced chronic lesions.

Admittedly there are patients who will improve and even heal without such rigid treatment. As yet we have no test but the trial and error methods for determining the unusual resistance which such individuals possess. So the safest plan is to use bed rest even longer than may be absolutely necessary in any particular case, for in the words of Trudeau, "I know

I have hurt nobody by rest but I am quite sure I often have by allowing them to exercise." Perhaps the fact that most of our patients fall in the far-advanced group and hence need a rather prolonged period of treatment has only served to emphasize the value of prolonged bed rest. For instance, in a recent analysis of 548 patients with pulmonary tuberculosis now in the Sanatorium, Cohen found cavitation, either unilateral or bilateral, present on admission in about 77 per cent. Cavitation was also present on admission in 50 per cent of those discharged in 1925, in 65.8 per cent of those discharged in 1931 and in 66.4 per cent of those discharged in 1932. Many of the patients with unilateral cavitation had disease in the other lung. Also, many of those without cavitation had bilateral pulmonary tuberculosis. Therefore prolonged bed rest may be needed before one lung has improved sufficiently to permit collapse therapy to be used on the other lung.

Some will claim that bed rest over such a long period of time will cause gastro-intestinal disturbances and degeneration of the muscular system. The gastro-intestinal disturbances can be controlled by diet. As for the degeneration of the muscular system, what of it? What are we treating, the muscular system or diseased lung? When the lungs are healed, the muscle tone can be easily restored by proper exercise.

After healing has ceased to progress under the use of bed rest as outlined above and the process has become stationary as determined by serial x-ray films, some other type of treatment is necessary. What this is will depend upon the extent of the healing. If slight, then, depending upon the type of lesion (old fibroid, fibro-caseous or caseous) exercise or collapse therapy is indicated. If marked, and nearly complete, then exercise so regulated as to promote further healing rather than to interfere with it is indicated. This can best be accomplished by using the same standard for increasing exercise as was used in determining when bed rest should be discontinued and exercise begun. That is, while the patient is improving no change in the treatment is indicated. So if a lesion which has become stationary under bed rest begins to heal again under a certain amount of exercise then this amount of exercise should be continued until the lesion becomes stationary again. When it does, of course, exercise should be increased. It is obvious that this stage in the treatment of tuberculosis is a very critical one and any over-exertion or indiscretion on the part of the patient may result in a spread of the disease and a reappearance of symptoms. When this occurs the patient must start his cure all over again. Therefore the physical activities should be kept within the limits which will continue the healing of the process.

If after a reasonable time it is apparent that bed rest alone will not produce the desired results, except after years of treatment, or perhaps never, then it should be supplemented by localized rest such as is secured through the various types of collapse therapy. We have found these procedures necessary in about 58.1 per cent of the 578 pulmonary patients now in residence.

According to Alexander,[1] this type of treatment (collapse therapy) is without doubt the most valuable contribution to the therapy of pulmonary tuberculosis since Dettweiler first introduced rest in 1870. Through it the most favorable conditional requirements for repair of the diseased lungs are secured.

According to Krause, pulmonary compression by means of pneumothorax was practiced by the Hippocratic School in the 5th Century B. C. Except for an occasional worker, it seemed to have been forgotten until its use was suggested again by Carson following the discovery of the elasticity of the lung early in the 19th Century. Carson[7] believed that the elasticity of the lung was the greatest obstacle to healing of the diseased area because it kept the disease tissues apart and in constant motion. He claimed that a lung would heal much more rapidly if the diseased area could be quiet and the inflamed surfaces and cavity walls brought together. He therefore concluded that a splint or some mechanical means should be employed to overcome the elasticity of the lung and suggested pneumothorax. Although this type of treatment seemed very logical to Carson it did not come into common use until twenty-five to thirty years ago. This is greatly to be regretted for without doubt at some time or other the majority of the consumptives who have died have been suitable cases for collapse therapy. Manifestly it should be the duty of every physician who is treating tuberculosis not to let that period pass without grasping the opportunity.

The action of collapse therapy is both mechanical and physiological. The compression atelecta-

sis collapses cavities, controls hemorrhage, and squeezes secretions from the lungs. The immobilization of the lung with the accompanying lymphatic and vascular stasis brings about a reduction of toxemia and greatly favors the healing of the tuberculous process.

Thus one might say that collapse therapy produces a physiological amputation of the lung and gives the body almost if not fully as much relief as does the removal of any purulent area such as an infected appendix, or the draining of a badly infected sinus.

Fibrosis by counteracting the elastic tension of the lung becomes nature's method of producing collapse therapy. To me this is just another argument for the desirability of overcoming this elasticity by some mechanical means and it is just another link in the chain of evidence which points to the value of pulmonary collapse in the treatment of pulmonary tuberculosis.

Collapse therapy is produced by artificial pneumothorax, by paralyzing the diaphragm through interference with the phrenic nerve, or by extrapleural thoracoplasty. Time will not permit more than a brief description of each procedure.

Artificial Pneumothorax.—This is the simplest, the most flexible, and therefore the most commonly used form of collapse therapy. It is indicated whenever bed rest does not produce the desired results and in patients with uncontrolled hemorrhage, large cavities, extensive unilateral disease and less extensive bilateral disease. In many such cases pneumothorax is begun within the first month or even within the first week after admission.

Extensive unilateral disease is the ideal condition for its use but that is seldom found and so it is usually used on less ideal cases.

In the beginning of the treatment small amounts of air are injected into the pleural cavity every other day but gradually the amount of injected air is increased and the interval of time between treatments is lengthened to ten days to three weeks.

The duration of the treatment varies from a minimum of about two years to a maximum of the rest of the life of the patient. The average duration is about five years.

The success of pneumothorax depends largely upon the condition of the pleural space, that is, whether the lung is free or bound down by adhesions, either completely or partially. Under suitable conditions isolated adhesions may be cut after the method of Jacobeus without an open operation, but care must be exercised in this procedure not to cut diseased lung tissue.

One of the complications which interfere with the success of pneumothorax is effusion. This may be large or small, serous or empyematous. This has occurred in 58 per cent of our pneumothorax patients. Other complications are: mediastinal hernia (5 per cent); mobile mediastinum (2 per cent); air embolism in two of 546 cases.

Results.—Pneumothorax was used or attempted in 546 patients discharged from Glen Lake Sanatorium prior to January 1, 1933. It was considered successful in 28.2 per cent even though in 3.5 per cent of this group it was supplemented by some other type of collapse therapy. In 22.1 per cent of the unsuccessful attempts no free pleural space could be found and adhesions or some other complication accounted for 49.6 per cent of failures. Fortunately we were able to use some other type of collapse therapy in 41.2 per cent of this group.

Bilateral pneumothorax has been used occasionally in patients with bilateral tuberculosis who had not improved under ordinary sanatorium treatment or who had shown a spread into the good lung while receiving unilateral pneumothorax. This is a painstaking, arduous procedure which should only be undertaken when the patient can be under very close supervision. We have had sixty-two such cases and of this number only 16.1 per cent could be considered satisfactory. Of this number 24.2 per cent had some other type of collapse therapy.

It should be remembered that this series goes back to 1917 when we first began to use pneumothorax. We believe that our next large series will show much more favorable results because we are using pneumothorax earlier and we have better facilities for the use of other types of collapse therapy.

Phrenic Nerve.—Paralyzing the diaphragm through interference of the phrenic nerve may be a permanent or temporary procedure. Temporary paralysis is usually secured by crushing the nerve. Permanent paralysis is obtained by excising a centimeter or two of the accessory branches as well as the main trunk, or by an evulsion of about 10 centimeters of the distal fragment of the main trunk. In all operations on the phrenic nerve the accessory phrenics must

be also included, or else the desired results will not be secured. This type of treatment is generally used in those patients in whom pneumothorax or thoracoplasty cannot be done or as a supplementary procedure to other types of collapse therapy. With this procedure individualization is necessary and it may be used before or after the other type of collapse. Whenever possible we prefer that it follow the other forms of collapse therapy. Among our patients discharged prior to January 1, 1933, there were 345 who had had 428 operations on the phrenic nerve. About 75 per cent obtained some relief or improvement in symptoms and a few, of course, obtained complete permanent clinical results.

Thoracoplasty.—The last and most radical form of collapse therapy is extrapleural thoracoplasty. This is a major surgical procedure and should only be undertaken by an individual well versed in surgical technic. It is a permanent operation and cannot be discontinued if the contralateral lung should develop a spread. Kinsella believes, therefore, that ideally the lesion in the contralateral lung should have been stationary for about a year before proceeding with this type of therapy. But here again individualization is necessary and so in selected cases this interval may be reduced by several months. It is indicated in those cases in whom pneumothorax is desirable but impossible or when for any reason it seems desirable to discontinue pneumothorax before the lesion is considered healed. It is also indicated in cases of tuberculous empyema because it obliterates the pleural space, thus favoring healing of the empyema. Occasionally thoracoplasty may be used in cases of hemorrhage and to relieve cardiac and respiratory embarrassment due to a marked mediastinal displacement in old chronic fibroid cases. It is contra-indicated in acute and in terminal tuberculosis and in apparently fatal extrapulmonary disease, tuberculous or non-tuberculous, such as advanced renal disease, cardiac disease, cancer, etc.

The operation of choice is the posterior extrapleural thoracoplasty and it is done in two or more stages. Frequently the antero-lateral segments are removed at the second stage of the operation in order to make the upper stage or the operation over the pathological process as radical as possible. In the end, this may be the more conservative procedure in that the more normal lung tissue is disturbed the least and may be not at all. The ideal interval of time between operations is two to three weeks.

Results.—In about 70 per cent of our series of 199 cases up to March 1, 1933, thoracoplasty has proved of enormous benefit. The remaining 30 per cent received little or no help from this type of treatment.

While I have described briefly each type of procedure used to secure localized collapse, all of these procedures may be used on the same patient. There are other procedures which can be used as adjuncts to the three mentioned, such as intercostal neurectomy, thereby limiting costal breathing, scalenotomy which reduces the breathing of the upper portion of the chest, intrapleural pneumolysis, extrapleural pneumolysis or extrapleural apicolysis.

Heliotherapy.—The modern use of the sun's rays as a therapeutic agent is due to Rollier,[8] who, becoming dissatisfied with the results of the surgical treatment of tuberculosis, established the first sanatorium for heliotherapy at Leysin, Switzerland, in 1903. He developed a very careful technic which, with certain modifications, is quite universally used today. The body is divided into zones and a progressively graded dosage of sunlight is given. This schedule is, of course, to be considered only as a basic schedule and individualization must be made in each case. All precautions against overexposure must be carefully observed or toxic symptoms such as nausea, headache, dizziness, and elevation of pulse and temperature will result.

Various types of lamps have been devised in an attempt to carry on the treatment during the winter time and on cloudy days. We prefer the carbon arc lamp because it is the closest approach to natural sunlight which the scientific world has yet devised. Even so it cannot be considered equal to the sun and should never be substituted for it. It should be used when the sunlight is not available, or is not tolerated.

Although heliotherapy was developed for cases of surgical tuberculosis it has, within the last few years, been used to a limited extent in cases of pulmonary tuberculosis also. And why shouldn't it? If tuberculosis is the same wherever it occurs, then the treatment which is so beneficial for one type of tuberculosis should be equally beneficial for the other. If it is not, then the method of applying it is wrong rather than the treatment.

Approximately one-third of our adults receiving heliotherapy have pulmonary tuberculosis, either alone or in combination with their extrapulmonary lesion. With them strict individualization is necessary. The sun schedule is increased much more slowly and the maximum time is usually about one-third of that employed for the extrapulmonary cases, which is one hour. Even that, however, is not rigidly adhered to because the chronic, fibroid cases can receive more sun than can the more active cases. The chest is kept covered until after the fifth day of exposure. If after uncovering the chest there is an unfavorable reaction the chest should be covered again.

We have not found that heliotherapy leads to hemoptysis even in those patients with a history of frequent hemorrhages. We have found moreover that in selected cases heliotherapy is very beneficial in pulmonary tuberculosis. We believe that if we learn more about heliotherapy we will be able to extend its treatment to include still different types of tuberculosis.

In attempting to evaluate this type of treatment we must not forget that it is always combined with rest until the lesion is quiescent or stationary.[4]

Nothing has been said so far about the question of food and fresh air in the treatment of tuberculosis. We believe that a diet adequate in calories, vitamins and minerals for the man in health is suitable for the consumptive. Of course if there is any metabolic disturbance present which would require a special diet if the individual did not have tuberculosis, this diet should be given to the individual who has tuberculosis. At present we are serving about 120 special diets a day, including diets for the diabetic, for the nephritic and any and all other metabolic disturbances which the human flesh is heir to. Because of the chronic nature of tuberculosis and the comparatively long stay of our patients, certain general hospitals in Minneapolis feel that the Sanatorium offers an excellent opportunity for the training of nurses in dietetics and we have an affiliation with them for that purpose.

In the past the value of fresh air has been over-emphasized. The body can receive all the stimulation it needs in a well ventilated room so constructed that it is not too warm in summer and with enough radiation in winter to keep the day temperature at about 65 degrees and the night temperature at about 40 degrees.

All the procedures thus far described for the treatment of tuberculosis have centered about rest. Even heliotherapy is combined with rest, and the various methods for producing collapse therapy are used for one purpose only and that is to bring about a greater rest of the diseased part. Rest, both general and localized, is the foundation for the general management of tuberculosis.

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FIRST INFECTION TYPE TUBERCULOSIS*

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WHAT IS IT?

THE first infection type of tuberculosis (often spoken of as primary tuberculosis and, if in the lung, childhood type of tuberculosis) is a *disease* resulting from the invasion of the tissues which are not sensitive or allergic to the protein fraction of the tubercle bacillus. After entering the body through any portal, the bacilli may be phagocytosed by polymorphonuclear leukocytes which in turn are ingested by large mononuclear leukocytes which may enter the lymph or blood stream and transport them to various parts of the body. In time the mononuclears become sluggish, lose their ameboid movement and lodge in fine capillaries, thus serving as foreign bodies. About each of them there gather many other large mononuclear leukocytes forming the giant cell. Thus, the early stage of tubercle formation, which is the first infection type of tuberculosis, begins.

WHERE DOES IT DEVELOP?

This type of tuberculosis may develop in any part of the body where bacilli find lodgment or where they are transported by leukocytes. The solitary tubercle in the brain is not an uncommon discovery when the proper search is made at postmortem. Likewise, solitary tubercles in other organs are often found. Again, the first infection lesion may develop near its portal of entry, such as an abrasion in the skin or in a tonsil or, if inhaled, in a lung, or, if ingested, somewhere along the digestive tract. Once the bacilli gain entrance to the lymph or blood stream, the phagocytes carrying them will most often lodge in those organs richly supplied with fine capillaries, such as the lungs. Apparently, this is the reason the lungs are said to be the most common site of the first infection type of tuberculosis. Multiple foci may be set up in the body from first infection. Even in the lungs of a single individual, numerous Ghon tubercles may be found; and, in the same body, tubercles representing the first infection type of disease may be seen in other organs.

WHEN DOES IT DEVELOP?

The first infection type of tuberculosis develops when tubercle bacilli first find lodgment and multiply in the tissues. This may be in early infancy, in late senility, or at any intervening time (Figures 1 and 2). Apparently, the one requirement for its development is absence of allergy or sensitiveness to tuberculo-protein.

HOW IS IT DETECTED?

There are now only two fine screens used in the detection of tuberculosis of the first infection type: the tuberculin test and the postmortem examination. The former is the finer of these screens. The positive reaction to tuberculin is due to sensitiveness of the tissues to the protein fraction of the tubercle bacillus. In nature this sensitiveness nearly always results from the growth of tubercle bacilli in the human body. Therefore, when the test is positive, one is safe in concluding that the first infection type of tuberculosis is present somewhere in the body. The postmortem examination, if carefully performed, reveals lesions of the first infection type previously unsuspected unless tuberculin tests have been administered. Some lesions are missed by this examination, however, because of their microscopic size or because they are in parts of the body not ordinarily examined. Ghon found them in 95 to 97 per cent of his examinations. Veterinarians find them by macroscopic examination in 88 to 92 per cent of positive tuberculin reactors on first testing. On subsequent testings the incidence is lower, since too little time has elapsed between infection and slaughter for all of the lesions to become macroscopic in size.

Symptoms are so mild or entirely absent as to be of little or no aid in the detection of the first infection type of tuberculosis.

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HOW CAN IT BE LOCATED DURING LIFE?

In the vast majority of cases its location is not determined during life. However, we have first infection type of tuberculosis is undetermined in the vast majority of cases. Only the complete postmortem examination locates them.

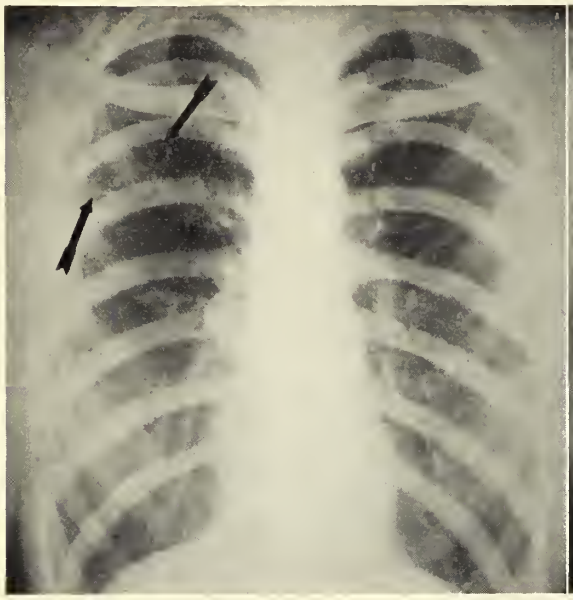


Fig. 1. M. H. B. X-ray film of the chest taken September 21, 1925, of a recent graduate in nursing, aged 26. No history of exposure to tuberculosis before entering school of nursing, June 22, 1922. Shows shadows in the right first and second interspaces, which proved to be first infection type of tuberculosis.



Fig. 2. M. H. B. X-ray film of the same chest (Fig. 1) taken on November 12, 1932. Shows evidence of Ghon tubercle formation in the right second interspace. When the first infection type of tuberculosis is postponed until adult life the reaction of the body is approximately the same as when it develops in infancy or childhood.

means of finding it in a very limited group. Usually, the physical examination is of no avail in any stage of its existence. When one suspects tuberculosis of a lymph node near the surface of the body, the quickest and most certain method of detecting its presence or absence is through biopsy.

One is able to locate the first infection type of tuberculosis by x-ray only in a small percentage of cases. In fact, only in those cases whose lesions in the lungs become quite large during the inflammatory stage and are so located that their x-ray shadows are not obscured by shadows of structures, such as the diaphragm, and those lesions in which sufficient calcium is later deposited to cast shadows visible to the naked eye on the x-ray film can the first infection type of tuberculosis be definitely located. Lesions containing considerable calcium may be detected not only in the lung and hilum but also in posterior mediastinal, mesenteric and cervical lymph nodes.

Thus, during life the location of lesions of the

IS THERE ANY DIFFERENCE WHETHER OR NOT ITS LOCATION IS DETERMINED?

The only reason we do not demonstrate the location of the first infection type of tuberculosis in the vast majority of cases during life is that our methods are too crude; that is, we have no fine screens. In my opinion there is little or no difference between the child who reacts positively to tuberculin and has no x-ray findings of disease and the child who reacts positively and has lesions located by x-ray. The former child may have just as large and just as many lesions as the latter, the only difference being that they are not so located as to be visualized. Again, the lesions in the former child may still be too small to be visualized on the film. Certainly both have foci of tuberculosis. Figures 3, 4, 5, and 6 illustrate two cases: one patient had a positive tuberculin reaction and had foci which could be located on first examination; the other also had a positive tuberculin reaction but no foci were located. Both have developed the reinfection type of disease.

IS IT TRANSMISSIBLE TO OTHERS?

Any tuberculous focus which is discharging tubercle bacilli may be dangerous to others. Tubercle bacilli have been demonstrated with considerable frequency in the gastric contents of children who have the first infection type of tuberculosis. Their presence in the stomach contents is dependent somewhat upon the stage of the disease. While in the acute inflammatory stage, bacilli are more likely to be found. However, caseous hilum lymph nodes may discharge tubercle bacilli at any stage of the disease even after considerable quantities of calcium have been laid down in the primary complex. Inasmuch as such children rarely cough or expectorate, obviously, their bacilli usually are not spread to others by way of the mouth. Instead, they are swallowed and eliminated by way of the intestinal tract. While the intestinal excreta may contain tubercle bacilli in abundance, they

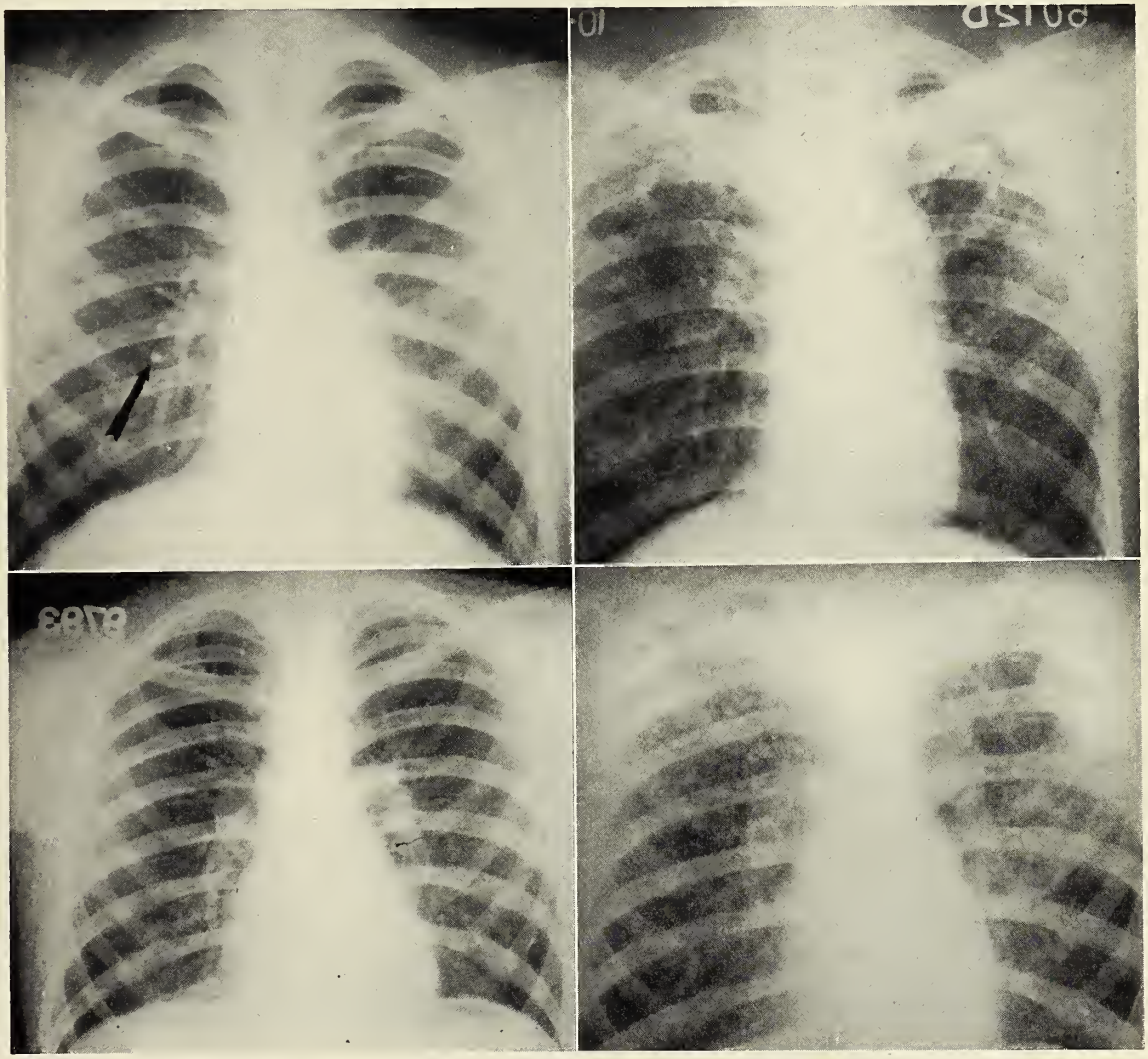


Fig. 3 *(upper left)*. H. P. X-ray film taken on September 19, 1924, of a boy of twelve years. Shows evidence of Ghon tubercle formation on the right side in the third interspace. No other abnormal shadows were seen. The tuberculin test was positive.

Fig. 4 *(upper right)*. H. P. X-ray film taken on October 6, 1932, of the same chest as seen in Figure 3. Shows evidence of far-advanced bilateral pulmonary tuberculosis.

Fig. 5 *(lower left)*. H. J. Film made on October 12, 1928, of the chest of a boy of thirteen years. Shows no evidence of tuberculosis. However, there was history of contact exposure and the tuberculin test was positive, which proved beyond doubt that the first infection type of tuberculosis was present somewhere in the body.

Fig. 6 *(lower right)*. H. J. Film made on March 22, 1933, of the same chest as seen in Figure 5. Shows evidence of extensive tuberculosis involving both lungs. It is obvious that in 1928 the tuberculin test was a much finer screen than the X-ray film. Inability to locate the lesion at that time was of no significance as far as later developments were concerned.

are far less likely to be spread to others than through sputum. In the early years of the Lymanhurst activities, patients with cough and expectoration but negative to tuberculin were often admitted. Many of these children were found to be suffering from such conditions as bronchiectasis. Although they were intimately associated with other children in the school, who did have first infection type of tuberculosis, they never became positive reactors. This is good evidence that children with the first infection type of tuberculosis are not a serious menace to others, as long as no bacilli are being discharged.

WHAT ARE ITS CHIEF CHARACTERISTICS?

1. At first, tubercle bacilli are not fixed in the primary focus. Many of them are carried to the nodes which receive lymph from the involved region. They are retained in the nodes where they set up foci of disease almost simultaneously with that of the original focus. Thus, if the primary focus is in a tonsil, the first cervical nodes through which its lymph passes will very quickly become involved; if in the intestine, the first mesenteric lymph nodes which drain the involved area will become tuberculous. Likewise, when in the lung, there is an early dissemination to the regional lymph nodes. The original focus, together with the foci in the lymph nodes draining it, is known as the primary complex.

2. The original focus very quickly becomes encapsulated with fibrous tissue although around it may remain for some time a considerable area of collateral inflammation. Within the capsule caseation occurs. Occasionally the caseous material finds its way into a bronchial ramification, thus leaving a small cavity in the space it occupied. More often the caseous material remains encapsulated, and calcium deposits are laid down within it. At the same time calcium is deposited in the caseous material in the regional lymph nodes. In some cases, calcium and even true bone are laid down in the capsule around the original focus.

3. Throughout the evolution of the first infection type of tuberculosis, there usually is no serious illness. This is true even in cases of rather extensive involvement. For this reason most adults who react positively to tuberculin are unable to state when their first infection type of disease developed.

4. The chief characteristic of the first infection type of tuberculosis is that it renders the tissues of the body allergic or sensitive to tuberculo-protein. This fact makes the tuberculin test our finest screen in the detection of this type of tuberculosis. If the bacilli are all destroyed by the defensive mechanism of the body or become so encapsulated that there is no communication between the focus and the body, the allergy disappears. Otherwise, it probably remains for the lifetime of the individual.

5. Some immunity is said to appear through the development of the primary complex. However, we have no specific test for it. Moreover, it is relative and apparently easily broken down. Therefore, immunity is an uncertain and undependable factor.

DOES IT COMPLETELY HEAL?

The first infection type of tuberculosis does completely heal but in what percentage of cases no one knows. The only person who is entitled to speak of a tuberculous lesion of the first infection type as healed is the pathologist and even he can do so only after careful microscopic study. We speak glibly of healed lesions from the x-ray shadows but there is no justification, scientific or otherwise, for such interpretations and opinions. Evidence of calcium deposits on the x-ray film is by no means definite assurance of complete healing. All that the film shows is the calcium; we are blind to what surrounds it by way of caseous material, etc., and the number of small lesions without calcium deposits in the lymph nodes and elsewhere. Even when a previous positive tuberculin reaction in an individual becomes negative, we cannot be sure that the lesion has completely healed. Perhaps it has only become so well encapsulated that there is no escape of its products to the body.

IS IT A SERIOUS DISEASE?

The first infection type of tuberculosis is a very benign disease. I believe it rarely if ever kills. Usually it causes no incapacity, whatsoever, and any symptoms associated with it pass unnoticed. However, it is a very serious disease in that it produces allergy and may at any time disseminate bacilli to other parts of the body.

WHAT IS ITS RELATIONSHIP TO THE RE-INFECTION TYPE (CLINICAL) TUBERCULOSIS?

The first infection type of tuberculosis always

precedes clinical disease; therefore, it may be looked upon as the forerunner of all destructive forms of tuberculosis. The allergy which it produces apparently gives the tissues the ability to fix tubercle bacilli of re-infection wherever they find lodgment. Around them there is immediately thrown out a polymorphonuclear leukocyte exudate, later followed by a large mononuclear exudate. This acute reaction quickly fixes them at or near the site of lodgment, where they often produce the destructive form of disease. They are fixed so quickly and so firmly that they are not even carried to the regional lymph nodes. Therefore, the body by reason of allergy reacts to tubercle bacilli of re-infection in an entirely different manner than it did to tubercle bacilli of first infection. The reaction to first infection is nearly always favorable while to re-infection it is often unfavorable from the standpoint of its control. Inasmuch as the tendency to progression is due to allergy, we must look upon the first infection type which produced the allergy as a serious disease.

Since the first infection type of disease often harbors living tubercle bacilli for years, and even for the lifetime of the individual, its foci may be likened to test tube cultures of virulent bacilli. As long as the test tube remains intact, the stopper is not removed, and the bacilli do not escape so as to reach the bodies of people, they are entirely harmless. So it is with the cultures in the primary complex in the human body. However, over the test tube cultures we have considerable control, whereas, over the cultures in our bodies, we have little control. We can only trust to our natural defense mechanism to hold them in abeyance. Not infrequently this fails, and bacilli are disseminated to allergic tissues where the destructive forms of disease may develop. If large numbers of bacilli escape into the blood stream or into the subarachnoid space, acute, rapidly fatal, miliary tuberculosis or meningitis results. If they escape into the bronchial tree, chronic clinical pulmonary tuberculosis may result; if into the pleural space or the peritoneal cavity, tuberculous pleurisy and peritonitis develop. The allergy resulting from the first infection type of tuberculosis likewise makes the body liable to clinical disease from bacilli admitted from exogenous sources. The re-infection type of disease may develop from endogenous or exogenous sources any time after allergy is established. Therefore, we see it in infancy, senility, and all intermediate ages. Thus, there is a very definite relationship between the first infection and re-infection types of tuberculosis. The latter cannot develop in the absence of the former.

HOW IS IT CLASSIFIED?

From observations at Lymanhurst, we see no need for an elaborate classification of the first infection type of tuberculosis. In our experience it takes the same course regardless of the part of the lung in which it develops; that is, we see it coming under control slowly but surely with Ghon tubercle formation in the base of a lung, just as in the apex. If we trace the same lesion from the time it appears in the inflammatory stage through to Ghon tubercle formation, we see that it goes through a number of stages, but all a part of the same process. About the only classification we need, therefore, is the following:

FIRST INFECTION TYPE OF TUBERCULOSIS

Always from exogenous sources. Develops any time in life when first infection from tubercle bacilli occurs. May make its appearance in any part of the body but most often in the lungs. Its presence is detected by sensitiveness to tuberculin.

1. *Location of lesion not demonstrable during life.*—In majority of cases the location of the disease is not demonstrable during life because our methods of examination are too crude. Nevertheless, a positive tuberculin reaction is definite proof that the first infection type of lesion is present.

2. *Location of lesion demonstrable during life.*—Such lesions may be near the surface, where they are easily examined and biopsy may be performed. Deeper lesions in the neck, abdomen, or chest may be demonstrated by x-ray film examination. When in the chest, one is able to observe them in the following stages:

a. *Inflammatory Stage.*—Considerable collateral inflammation in the lung parenchyma around the focus of tubercle bacilli. This may be just large enough to cast a shadow visible on the x-ray film or it may involve the greater part of a lobe. The homogeneous x-ray shadow is often mistaken for tuberculous pneumonia. It may appear in any part of the lung. Simultaneously there is enlargement of regional lymph nodes due to tuberculosis but usually they are not visualized on the x-ray film. The shadow usually remains unchanged for many months.

b. *Resolving Stage.*—Shadow loses its homogeneousness by the appearance of clear areas. Entire shadow may finally disappear or there may remain a small area of density around the focus. After resolution begins, many months are required before it is complete.

c. *Calcifying and Ossifying Stage.*—Not all lesions have enough calcium deposited in them to cast visible shadows on x-ray film. In some lesions small densities will first make their appearance on the film and increase in size until one sees a single shadow of considerable size cast by the calcium deposits. True bone is found in 25 to 35 per cent of such lesions. Shadows representing calcium deposits in the regional lymph nodes are often visualized. Calcium deposits may make their appearance in a few months but usually many months or a few years are required.

d. *Stationary Stage.*—After calcium is deposited, the x-ray shadow may appear the same for years or even the lifetime of the individual. However, pathologists have shown that in the immediate vicinity of the focus tubercles are constantly being formed. Calcium deposits may be expectorated, thus removing the evidence from the x-ray film. Again, they may be completely absorbed so the film no longer reveals any evidence of disease. To this stage the terms apparently arrested or arrested may be applied but during the lifetime of the individual the terms apparently healed or healed are never justified. The word "cured," if used, refers only to the objective symptoms of patient.

The classification of re-infection type of tuberculosis into minimal, moderately advanced, and far advanced disease with A, B, and C symptoms is not applicable in the first infection of tuberculosis.

SHOULD IT BE REPORTED TO THE HEALTH DEPARTMENT?

In Figure 7, one sees the course which tuberculosis takes in the human body. Generally speaking, all infants are born free from tuberculosis; therefore, they react negatively to tuberculin at the time of birth. Some will subsequently come in contact with tubercle bacilli and will develop foci of tuberculosis, which will result in sensitiveness to tuberculin. If their foods are contaminated with tubercle bacilli and they come in contact with large numbers of open cases of tuberculosis, approximately 100 per cent will react positively by the time young adult life is reached. In fact, such conditions existed when the early studies were made in Vienna. Obviously, the less the exposure, the greater the number of infants and children who remain negative to tuberculin. In Minnesota and Wisconsin, approximately 70 per cent of the girls and boys of university age are free from the first infection type of disease and, therefore, are negative to the tuberculin test. The remaining 30 per cent (Figure *7A*) have come in contact with tubercle bacilli, have taken them into their bodies, where foci of tuberculosis have developed. They react positively to the tuberculin test. This is the very beginning of tuberculosis and here is where reporting to the health department should begin. Some from the 70 per cent will become infected with tubercle bacilli through exposure as their years advance. The group of positive reactors will contribute the greater part of the tuberculosis load of the future. Their potentialities are great.

The first infection foci of disease may never be located during life. In a small percentage, however, the x-ray film will show the location of these foci. In Figure 7, these groups are represented by B and C. Some members from Group B will later show x-ray changes representing the first infection type of disease; therefore, they must immediately be transferred to Group C. The potentialities in Group C are again great. The majority of those showing x-ray evidence of disease have only the first infection type, D, but a small percentage have evidence of the re-infection type alone, or in co-existence with the first infection type, E. Whether or not the first infection type is demonstrated on the x-ray film makes no difference; it is present somewhere in every member of Group E. Therefore, Group B, as well as Group D, may at any time contribute to Group E. Those in Group E may be subgrouped according to their stage of re-infection or clinical disease, as seen in F, G, and H. Unfortunately, in the past we have allowed the whole tuberculosis scene to be enacted in the human body before the disease was reported; in fact, it was not until patients or members of the various groups had been transferred to Groups F, G, and H, that they were reported, and a more discouraging fact in Minnesota is that approximately 30 per cent of the cases have been reported for the first time by the death certificate. Patients from Groups F, G, and H are all transferred to Group I, where some respond to treatment and recover completely; others recover only in part, and some die. In every group, beginning with A and ending with I, there is the possibility of endogenous re-infection into the blood stream or into the subarachnoid space. Such members are immediately transferred to Group J, where they die of tuberculous meningitis or miliary tuberculosis. Until we begin our efforts against tuberculosis in the very beginning of its existence in the body, and report all posi-

tive reactors, as well as clinical cases, and treat them accordingly, we can not hope to advance much beyond our present position.

The incidence of positive reactors is so low among children today that the reaction to tuberculin has a significant meaning. If there is no other finding than the positive tuberculin reaction, it would seem feasible to have such cases reported to the health department and carried in a separate file from that of the positive sputum and re-infection cases of tuberculosis. The information so assembled would be of great value in two ways: (1) It would inform the health department that every such case had been exposed, so that a search might be made for the source; (2) it would inform the health department that all such persons are potential cases of clinical tuberculosis and, therefore, should be kept under close observation, particularly during the teen ages and the twenties. A separate file would prevent the stigmata which many people believe would accompany the reporting of such cases in the same manner as we now report clinical cases.

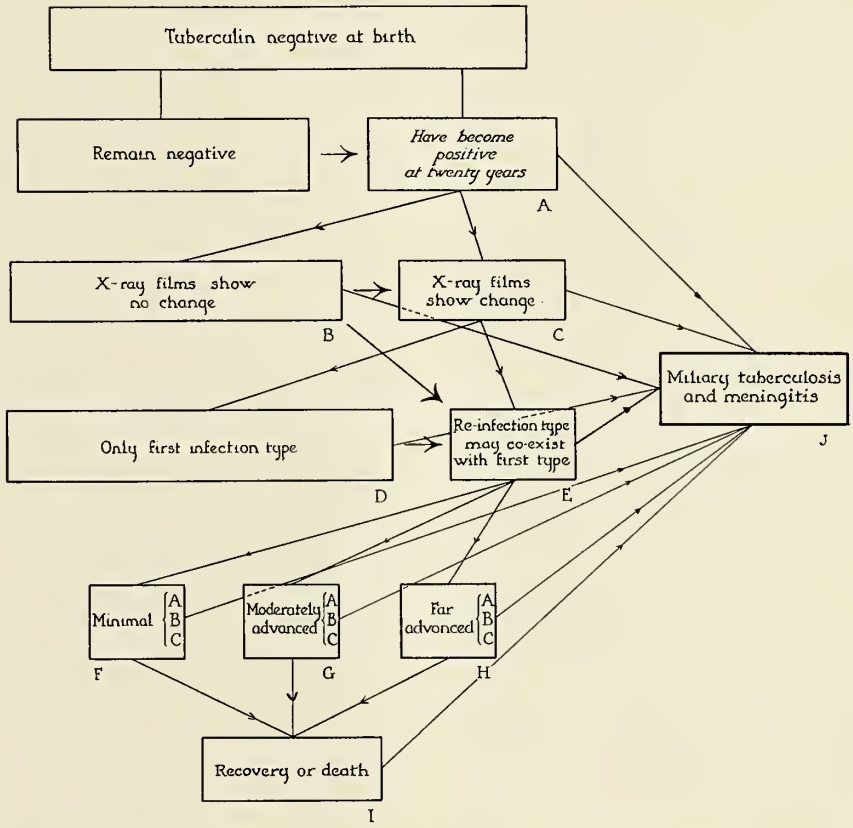


Fig. 7. Diagram of courses tuberculosis takes after the body has become contaminated with tubercle bacilli.

WHAT TREATMENT DOES IT REQUIRE?

Once we allow the first infection type of tuberculosis to develop, we are at its mercy. There is little evidence to show that treatment is of any avail. The body controls the disease under all kinds of living conditions of the hosts. The child with excellent care does not seem to fare any better than the child of the slums. In the early days of our work, we believed that sanatorium treatment was essential for every child with a demonstrable lesion in the acute inflammatory stage. We soon learned, however, that the child who went to a sanatorium did not fare any better than the child who remained at home and took part in the same activities as the other children of the neighborhood. Nor is there any evidence that such children do better in a preventorium than at home. About all we can say for the summer camp in the treatment of these chil-

dren is that it may improve their environments temporarily if their home conditions are poor. Camps conducted by luncheon clubs, religious organizations, etc., serve the same purpose as those supported by taxation or Christmas seal funds.

There are certain very definite attentions which must be paid these cases, such as breaking the contact exposure, close observation, and health education. When a child is found to have the first infection type of tuberculosis, as manifested by a positive tuberculin reaction, the first step should be to prevent all further exposure at the earliest possible moment. His tissues are allergic, and the intake of more bacilli may result in the destructive re-infection type of disease. Each positive reactor should be kept under close observation in order that any early manifestation of the re-infection type of disease may be detected. This observation should include x-ray films of the chest annually, or better, semi-annually. The films are not made with a view to detect the location of the first infection type of disease but rather to locate the re-infection type at the earliest possible time when the shadow can be visualized on the film.

The medical and educational work among such children, their parents, and the community, can well be carried on by private physicians. In cities the special school, in conjunction with the supervision of private physicians, is the happiest solution. In such schools a splendid health spirit develops. Rather than occupying beds, the children remain ambulatory and continue their school work, are kept under close observation for symptoms and signs of clinical disease, and have x-ray films periodically. Moreover, their health education work can be carried out in an ideal manner.

HOW CAN IT BE PREVENTED?

There is no satisfactory vaccine or immunization method in tuberculosis prevention work. Although Calmette's vaccine, BCG, has been administered to large numbers in Europe and to a small number in this country, it has not yet been universally accepted. There are two very definite objections to its use which probably can not be overcome if at all in less than a quarter of a century of observation on those to whom it has been administered.

The only satisfactory way of preventing the first infection type of tuberculosis is to prevent contact exposure. Much has been done to remove from communities sources of tubercle bacilli which in years past would have remained to contaminate children and adults. I refer particularly to pasteurization of milk, area testing, slaughter of tuberculous cattle, institutionalization for the isolation of tuberculous patients who can not have satisfactory care at home, and the teaching of thousands of others how to prevent the spread of their bacilli. Case-finding work is in progress, which is resulting in the diagnosis of unsuspected cases of tuberculosis, particularly among teen age girls and boys, teachers, and the older people of communities. Such case-finding work not only detects the open but unsuspected cases but also detects many with lesions which have not yet broken down and which may be treated before they disseminate tubercle bacilli to others. This is preventive medicine of the very highest type, in that it breaks the vicious cycle of tuberculosis. We already have all the facts we need in the control of tuberculosis; that is, if we never have one more fact, scientific or otherwise, added to our knowledge of the disease, we can with sufficient funds and proper coöperation continue to reduce the number of first infection types of tuberculosis, both among children and adults, until within a generation or so the positive tuberculin reactor, even among adults, will be rare.

APPENDICITIS IN THE TUBERCULOUS*

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Nopeming, Minnesota

THE following presentation is a brief review of the literature on tuberculous appendicitis and a preliminary report on appendectomy in patients undergoing treatment for pulmonary tuberculosis.

An analysis published by Rubin of 500 consecutive necropsies in patients suffering from pulmonary tuberculosis showed that in 324, or

*Read before the St. Louis County Medical Society, at Nopeming, Minn., May 10, 1933.

65 per cent, the intestine had macroscopic tuberculosis ulcerations, the appendix being involved in 22 per cent. Fenwick reported that in 2,000 autopsies on tuberculous patients he found the appendix was the only part of the intestinal tract involved in seventeen. Mayo says that at the clinic they always found tuberculosis of the cecum when the appendix was involved. DaCosta, in his text-book of surgery, suggests that the presence of large lymph nodes, so often associated with tuberculosis of the cecum and appendix, would indicate a primary lesion here and that it is in these cases with lymph-node involvement that active cell proliferation, peritoneal fusion and relapse following appendectomy occur.

It appears then from the above observations that the appendix may be the only site of intestinal tuberculosis, or the primary focus of infection, or, more commonly, an accompanying lesion in tuberculosis of the cecum.

There are three types of tuberculous disease of the appendix found. The miliary form found on the serous coating is usually associated with tuberculous peritonitis. The hypertrophic form is characterized by massive formation of dense scar tissue and is associated with the interesting but rare hyperplastic ileo-cecal tuberculosis which causes stenosis of the bowel and simulates carcinoma in signs and symptoms. The ulcerative form occurs in the mucosa, the ulcers having jagged outlines, undermined edges and caseous tissue in the base.

The appendix may become infected by the bloodstream, from adjacent organs or more commonly from the infected contents of its lumen. Various men have reported the incidence of tuberculous infection in all appendices in percentages ranging from 0.44 to 0.65 per cent and that by far the most common cause of appendicitis occurring in tuberculous patients is not the tubercle bacilli but the pyogenic bacteria.

I have reviewed forty cases of pulmonary tuberculosis in which appendectomies were performed. I am not prepared at this time to make any statement in regard to the ultimate effect on the pulmonary lesions.

Eighty per cent of the patients had generalized abdominal pain. Localized right lower quadrant pain was mentioned in 90 per cent of the histories. Nausea and vomiting was present in 48 per cent of the patients.

The fever curves were not studied except to note that none had a temperature higher than 101.3° immediately before operation and only six had temperatures of 102° or over after the operation.

Leukocyte counts ranged from 7,000 to 26,000 per cu. mm., 50 per cent being between 10,000 and 14,000. The anesthetics used were: ethylene, 7; ethylene and ether, 3; nitrous oxide, 1; local infiltration with novocaine, 8; spinal, 18; and not reported, 2.

There were no postoperative exacerbations of the pulmonary condition during the immediate convalescence.

There was only one death in the series and that was attributed to myocarditis.

The pathologic report revealed that two of the appendices were tuberculous, one of these having a superimposed pyogenic infection, which reminds us of the statement made by Cornil and Richelot that a pyogenic infection may cause the tuberculous process to slough out of the appendix.

In only about two-thirds of the cases was a microscopic examination the basis for the pathological report. Scott emphasizes the need of such an examination because macroscopically the true condition may pass unrecognized by the surgeon or the pathologist.

The following conclusions have been drawn after studying this small series:

1. The symptoms of appendicitis in tuberculous patients are clear cut as in non-tuberculous patients. One must beware of making the diagnosis of tuberculosis of the bowel before thinking of acute appendicitis.

2. The anesthetic of choice is local infiltration or spinal.

3. The postoperative course in this group was normal.

4. Appendicitis due to tuberculosis is uncommon even in tuberculous patients.

5. A microscopic examination should be made of the appendix removed from tuberculous patients.

6. The mortality rate from appendectomy is not high in tuberculous patients.

RESERVOIRS OF ECHINOCOCCUS IN MINNESOTA*

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Saint Paul

ABOUT 450 cases of echinococcosis, or hydatid disease of man are recorded for the United States and Canada. When we consider the difficulty of diagnosis, the long period of latency, in some cases as long as thirty years, and the further fact that it is the exception rather than the rule to publish case reports, it is obvious that this parasitic infection is not as rare in this country as is ordinarily assumed.

Supporting evidence of this fact is found in the results obtained by the federal and state meat inspection services. *Echinococcus* infections are by no means rare in hogs, sheep, and cattle. Ransom, in 1915, called attention to the fact that they were being found in alarming numbers in carcasses from parts of Virginia, Oklahoma and Arkansas. They occur in about 5 per cent of the hogs slaughtered in the Municipal abattoir of Baton Rouge, Louisiana, and the manager states that only a few years ago the incidence was as high as 20 per cent.

An astonishing fact, in view of the occurrence of human cases and of those in domesticated animals, is that the adult stage in dogs has been reported authoritatively but once. Cooper Curtice, in 1892, notes "*Taenia echinococcus* von Siebold, very minute, found but once, in a dog killed at the Washington, D. C., pound." Since that time there have been thousands of examinations of dogs for parasites in medical and parasitology laboratories all over the country. Thinking that the record might have been added to by the workers in the Federal Bureau of Animal Industry, I inquired of Dr. M. C. Hall, Chief of the Zoological Division of the Bureau, and was informed that they had not encountered the adult worm except in experimental feedings.

A number of medical workers have explained this on the grounds that the great majority of cases of hydatid disease of man occur in foreign born individuals or in those who have travelled in endemic regions. That this explanation is not sufficient is shown by the frequency of the disease in domesticated animals in this country. There must be widely distributed carriers of the adult worm.

Some very significant findings have been made in the course of a study of the parasites and diseases of Minnesota moose, conducted coöperatively by the Division of Veterinary Medicine and the Division of Entomology and Economic Zoology of the University of Minnesota. In a mature male moose from St. Louis County, autopsied by Dr. C. R. Donham, were found cysts in the lungs which were identified by the writer as those of *Echinococcus granulosus.* Since that time these hydatid cysts have been found in the lungs of five other moose, giving an astonishing total of six infections out of thirteen animals examined for parasites. With one exception the moose were from St. Louis County. The sixth one was from Cook County. Mr. F. G. Wallace, assistant in the Division of Entomology, fed some of these pulmonary cysts to a dog and two months later recovered a great number of adult tapeworms typical of *Echinococcus granulosus.*

Finding these hydatid cysts in animals which notoriously shun the haunts of man indicated that some other primary host than the dog was concerned in the maintenance of the parasite. Attention was directed to the wolf and through the courtesy of Warden Arthur Johnson, of the State Fish and Game Commission, three carcasses of timber wolves from Cook County were secured. Two of these harbored adult *Echinococcus* tapeworms.

That wolves and foxes, as well as dogs, serve as primary hosts for this dangerous worm is known from European records, but I do not believe that these hosts have been implicated before in this country. It is obvious that not only moose but also deer, domesticated animals and man may suffer infections from this source. Human cases may be contracted from eating strawberries, huckleberries, and other contaminated fruits from the region where the primary

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hosts occur. Moreover, it must be recognized that human beings who handle carcasses of wolves or dogs which harbor the adult are liable to infections.

It would seem that deer would play an important rôle as carriers of the cystic stage, although I have had no reports from the United States. I should be glad to examine and report upon suspicious-looking cysts from the liver or lungs of these or other animals.

SARCOMA OF THE UTERINE CERVIX*

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Minneapolis

MYOMATA of the uterine cervix occur less commonly in the uterine cervix than in the body of the uterus. It has been variously estimated to occur in the cervix in 3.5 to 25 per cent of cases, the average in a large series being in the neighborhood of 12 per cent according to Lockyer. The occurrence of carcinoma in the same locations is about reversed. Myomata are stated by Lockyer to be more frequent on the posterior than on the anterior wall, and they usually form an elongated mass which makes the cervical canal four or five times as long as normal. As a tumor in this location enlarges it may fill the pelvis snugly, forcing the fundus up into the abdomen and even at times obstructing the neck of the bladder by pressure against the os pubis. Smaller tumors growing from the cervix may become pedunculated, forming a polypoid type of growth and if this occurs the mass seldom becomes very large.

Sarcomatous metaplasia of a cervical myoma is by no means common. Occasionally sarcoma in this location may develop from a corporeal growth which has extended downward, but more commonly it takes origin from a preexisting myoma. The frequency with which a myoma may become sarcomatous is a matter of considerable practical importance and Masson, Aschoff, McDonald and others have estimated that about 1 per cent of uterine myomata become sarcomatous.

Sarcoma of the uterus occurs most frequently at about the climacteric and anatomically these tumors may be divided into the parenchymatous and mucosal types depending on their point of origin. These sarcomatous growths may resemble myomata, appearing as distinct roundish masses of variable size and consistency in the parenchyma, or they may take origin from the submucosa, become pedunculated and present the symptoms of a polyp. The latter type may invade the mucosa rapidly, and if removed without wide resection of the base there is a marked tendency to recurrence, as one would expect from the histologic character of this tumor. This further emphasizes the fact that all polypi removed from the fundus or cervix, as well as any suspicious lesion, should be subjected to microscopic examination rather than to trust the naked eye.

Myosarcomata are generally regarded as myomata which have undergone sarcomatous metaplasia. This may reasonably be expected from a study of the natural history of a myoma, the cell types of which are fibroblast and leioblast. These cells can easily undergo malignant metaplasia, as demonstrated by a number of investigators.

Grossly a sarcomatous area in a myoma is evidenced by a yellowish homogenous appearance on the cut surface as distinguished from the whorls of a myoma. Cysts and hemorrhages in the malignant area are common. Microscopically the cell nuclei are enlarged, frequently show mitotic figures, and the collagen fibers are elongated to form spindle cells with long intercellular processes. Cullen states that hyaline degeneration and sarcomatous metaplasia are so frequently associated that there probably is a relation between the two. According to him this may possibly indicate decreased vital activity of the cells.

Clinically these tumors may grow little or none at all for a long period and then suddenly show signs of rapid development. Local extension of the growth into the parametrium, peritoneum, or uterine cavity may be early and widespread. In the corpus, sarcoma causes a softening of the uterine muscle so these tumors feel doughy and

*Presented before the Hennepin County Medical Society, April 5, 1933.

somewhat resemble the pregnant uterus. Sarcoma frequently gives rise to a much larger tumor than does carcinoma. Pyometra and hematometra occasionally occur as a result of obstruction in the uterine canal. In the cervix the condition may be extensively developed before symptoms are produced, but when pain is present, it is usually an evidence that the disease has gone beyond the cervix. Lymphatic and blood-born metastases in adjacent glands and distant organs may occur but this is commonly a late phenomenon. Recurrences after operation are practically always local, so that if the growth can be widely resected, prospects of cure are excellent. Whenever a previously benign myoma shows signs of enlarging, especially after the climacteric has taken place, sarcoma should be suspected; and in the presence of ascites, cachexia and loss of weight, malignancy is almost certain. Because of the rarity of sarcomata, however, it must not be forgotten that a uterine tumor associated with irregular bleeding after the menopause is much more likely to be a myoma associated with a carcinoma, than a sarcoma.



Fig. 1. Myosarcoma of the cervix, low power. Moderately cellular type of growth.



Fig. 2. Same tumor, high power. Increase in number as well as size of cell nuclei.

The prognosis in a rapidly growing sarcoma is very serious, but in some types of lesions such as the fibro- and myosarcomatas, growth is likely to be slow. The round cell type is especially malignant. In those cases treated by radical resection, operative mortality is 4 per cent (Masson).

The treatment in operable cases is abdominal panhysterectomy. This consists in the removal of the uterus and its appendages through a low midline incision, resecting the cervix with a cuff of vaginal tissue so that all gland bearing and adjacent vulnerable tissues are taken away.

Radiation therapy has been warmly recommended but Masson states that in from 20 to 24 per cent of these cases no beneficial results have been obtained. The consensus of opinion is that operation followed by radiation is preferable.

CASE REPORT

A female, forty-six years of age, came for examination January 10, 1933. She had had two normal pregnancies, the last one seventeen years previously, and since then menstruation had taken place regularly and normally. Nephrectomy had been done in 1929 for an acid fast infection in the kidney and since then she had had no symptoms referable to the genitourinary tract.

Her complaints on admission were malaise and general ill feeling for the past two or three months. She had lost no weight and she complained of no definite

pain. There had been a small amount of whitish discharge from the vagina between menses for the past few months, but otherwise no menstrual disturbances had been noticeable.

On examination there were no relevant physical findings except as stated below. The blood pressure in millimeters of mercury was 126 systolic and 84 diastolic. The pulse averaged 76 beats per minute and the temperature was 98.6° F. Hemoglobin concentration of the blood was found to be 78 per cent by the Dare method, and examination of the urine gave negative results. The Wassermann and Kahn reactions of the blood were reported negative. Examination of the cervix through a speculum showed considerable enlargement of the posterior lip due to a hard rounded mass lying deep in the tissues, but presenting no evidence of extension or attachment to any of the neighboring structures. There was no erosion of the epithelium overlying the mass. Bimanual examination of the uterus and its appendages gave no abnormal findings. A diagnosis of probable cervical myoma was made and biopsy and removal recommended.

March 3, 1933, under nitrous oxide and ether anesthesia a small portion of this mass was removed through the vagina. When the pathologist reported the condition to be myosarcoma, preparation for laparotomy was made and the abdomen was opened through a low midline incision. No metastases or evidences of local extension of the growth were made out, consequently the uterus with both tubes and ovaries along with a cuff of vaginal tissue were removed. Peritonealization was accomplished by bringing together in the midline the stumps of the round ligaments over the sutured portion of the vaginal vault. Convalescence was without incident and the patient left the hospital on the fourteenth postoperative day. At present she states that she is in excellent condition (April 6, 1933).

Examination of the specimen removed showed a friable mass in the posterior wall of the cervix measuring 3 by 3 by 3 cm. The cut surface presented a homogenous appearance due to considerable necrosis and hyalinization which had taken place, and microscopically there were present numerous bundles of large cylindrical cells with a few mitotic figures. The pathologic diagnosis was myosarcoma. Two very small myomata were present on the anterior wall of the fundus of the uterus which on gross and microscopic examination proved to be of a benign character.

The evidence in this particular case points to the fact that the myosarcoma developed from a degenerating myoma as shown by the circumscribed somewhat encapsulated local lesion as well as by the presence of several other small myomata in the body of the uterus. The prognosis should be excellent inasmuch as wide resection of the tumor was done and no evidence of either extension or metastases were present. The marked tendency of myosarcomata, no matter where its location, to recur after local removal has been emphasized elsewhere (Rankin and Larson). However, in most of these cases by means of wide resection before extension or metastasis have taken place, permanent cure can be expected.

1737 MEDICAL ARTS BLDG.

FUADIN

The Council on Pharmacy and Chemistry reports that Fuadin is a complex trivalent antimony compound (sodium antimony^{III} biscatechol-disulfonate of sodium), distributed by the Winthrop Chemical Company. It is marketed in the form of a solution, in ampules containing about 6.3 per cent of the drug and representing about 8.5 mg. of antimony per cubic centimeter. It is proposed for use in the treatment of bilharziasis and granuloma inguinale in place of antimony and potassium tartrate, and is administered in doses of from 1.5 to 5 c.c. until a total of from 40 to 45 c.c. has been given. The Council's Committee on Nomenclature felt that the selection of the name Fuadin (named after Fuad I, King of Egypt, because of his interest in the product) is regrettable. However, it was not found technically in conflict with the Council's rules and, since the firm for practical reasons hesitates to give it up, the Council voted to recognize it. Fuadin was synthesized by H. Schmidt of Elberfeld for use in the treatment of bilharziasis. The pharmacology has to some extent been elucidated by Hammuda of Cairo and Weese of Elberfeld, who found the compound safe in therapeutic dosage. No data on toxicity and excretion were found in the published literature. Khalil and his co-workers have treated a large series of cases of bilharziasis with Fuadin with reported excellent results, and claim it to be superior to antimony and potassium tartrate in that it may be administered intramuscularly, side actions are less pronounced, and the course of treatment may be shortened. The use of Fuadin in granuloma inguinale is still in the experimental stage; the data presented in the paper of Williamson et al are incomplete and must be supplemented by more complete reports before the therapeutic usefulness of Fuadin may be considered to be established. No information was available to the Council's referee as to the effects of Fuadin on the kidneys. As antimony compounds are known to be renal irritants, caution is indicated until this phase of the problem has been properly elucidated. As a result of its consideration of Fuadin, the Council held that the use of this drug in granuloma inguinale is still in the experimental stage and that great caution is necessary in its use. The Council postponed further consideration of the product until confirmatory evidence for its therapeutic value becomes available. (Jour. A. M. A., May 27, 1933, p. 1685.)

MANAGEMENT OF AMEBIC DYSENTERY

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Saint Paul

IN endemic centers of Endameba histolytica infection, treatment is begun immediately in any patient presenting dysenteric symptoms, even though the organisms are not found by laboratory examinations. The frequent association of the dysentery bacillus may prevent the identification of the Endameba histolytica but specific therapy directed against the latter often permits the recognition of the smaller vegetative transition forms after four to five days.

Practical measures to be adopted in the treatment of amebic dysentery are the following:

1. Complete bed rest. This applies in most cases as patients usually present themselves with acute primary or relapse forms of the disease. Protection is thus partially assured against further exhaustion and any toxic effects of medication. A bedside commode or, preferably, a bedpan is used entirely; concurrent disinfection of the feces and soiled articles is observed.

2. Emetine hydrochloride should be given subcutaneously in daily dosage of 0.04 Gm. (gr. ⅔) for seven days. In sporadic cases occurring in non-endemic areas this would begin only after identification of the histolytica in the stools. For all practical purposes, such identification is made on seeing actively motile ameba containing ingested red blood cells. Quick response to emetine will decrease the number of vegetative forms after a few days treatment. Daily microscopic examinations of stool specimens have only academic interest during the first two weeks of the treatment course. A word of caution: dosage of emetine is sometimes recommended to the extent of 0.10 Gm. (gr. 1½) daily for ten to fourteen days or longer. This invites depression and paralysis of the heart as noted by shortness of breath and marked cardiac arrythmia, gastrointestinal irritation and acidosis. Elderly patients or those suffering from circulatory disease should be watched carefully. Intramuscular injection of emetine is exceedingly painful (personally verified); intravenous administration of 0.03 Gm. (gr. ½) is rarely used in acute fulminating cases but is inadvisable.

3. Bismuth subnitrate or subcarbonate is very effective in large, heaping teaspoonful doses every four hours for seven to ten days. The powder is given suspended in warm water in the first few days; after that in hot milk. The drug may be administered also during the first few nights, which are usually sleepless ones for the patient because of frequent stools and tenesmus. The subnitrate is better tolerated, more available and economical than the bismuth emetine iodide, from which patients complain of slight purging, nausea and vomiting. Personal experience bears out this point.

4. Diet during the first four days of the acute stage is chiefly liquid, consisting of well-cooked vegetable soups at frequent intervals, tea sweetened to the limit; then hot milk, cream soups and farinaceous foods.

5. Ipecac in salol-coated pills is begun at the entrance to the convalescent stage with cyst-laden stools. Ten pills of five grains each are given at bedtime each night, for one to two weeks. The salol covering is pierced by a needle before use to permit intestinal disintegration and to avoid more than three pills being passed in the stool each day.

6. Yatren may be given by mouth (gr.VI. t.i.d.) and concurrently by rectum (200 c.c. 2.5 per cent retained for two hours) if indications point to lesions in the lower bowel. A cleansing enema of 2 per cent sodium bicarbonate precedes the yatren retention. Yatren, like ipecac, is only mentioned, not recommended.

7. Arsenicals are to be preferred for the clearing up of the histolytica carriers. Ipecac and yatren occasionally succeed where neoarsphenamine, stovarsol or treparsol fail, but the contrary is more often true. Arsenic tonic effects are also to be kept in mind, as well as its toxicity. Neoarsphenamine is given intravenously (0.3 Gm.) every third day until ten injections are reached. Stovarsol or treparsol is

†Dr. Rock has had five years' medical experience in Central America, Panama and Brazil, where amebiasis is prevalent.

given by mouth in doses of 0.25 Gm.t.i.d., for a week; then once daily for two weeks. I have seen several patients that showed cysts in the stools for six months in spite of all other forms of treatment, become cyst-free within a week after combined neoarsphenamine and stovarsol therapy. Latterly, treparsol appeared more efficient than stovarsol.

8. Complications will be minimized by a careful note of any fever rise or leukocytosis; thus a pre-suppurative hepatitis is found early. When a patient becomes cyst-free, he is instructed to be on the lookout for any period of fever and during the first year to report every three months for stool examination.

9. Patient's environment. The room is screened, as flies commonly spread the disease by feeding on cyst-containing feces and can pass cysts through the intestinal canal within five minutes and deposit them on ready-to-eat food. It is to be noted that houseflies may be seen about heated buildings in late autumn in Minnesota. In the acute stage, more than the bedpan alone should be considered contaminated, as the resistant cysts may even be carried in dust to lodge on unprotected foodstuffs. The practitioner's responsibility does not end with care of the individual under observation. Usually a latent case can be found in the family, especially when history indicates exposure to a common source. One should early adopt the habit of stool examinations of other members of a household, food-handlers first, when a patient's condition is first diagnosed. It is rather wasted effort to return him after treatment to become re-infected by a symptomless histolytica carrier of the household. Efforts in the direction of family examination are frequently appreciated by all members.

SULPHARSPHENAMINE: ITS USES AND LIMITATIONS

For some years the Council on Pharmacy and Chemistry has considered the question of the high incidence of untoward reactions from sulpharsphenamine as compared with other arsphenamines. In 1925 a paragraph of warning was included in the description of the drug appearing in the current edition of New and Non-official Remedies. Recently question was raised as to whether, in view of the admitted danger from the use of sulpharsphenamine, it should no longer be recognized by description in New and Non-official Remedies. In order to obtain guidance in the matter, the Council sent a questionnaire to sixty-one dermato-syphilographers in the United States. In answer to the first question: "Do you regard sulpharsphenamine as more toxic than the other arsphenamines?" 42 answered "yes," and 9 "no." To the second question: "Are you continuing the use of sulpharsphenamine in your clinic?" 16 answered "yes"; 9 replied that they were using it in a very limited manner; 27 answered "no." To the third question: "Do you believe that the Councii on Pharmacy and Chemistry would be justified in withdrawing this preparation from further recognition in New and Non-official Remedies, because of its greater tendency to dangerous reaction?" 28 answered "yes," 2 gave a questionable answer, and 22 answered "no." In view of the diversity of opinions and the considerable group of men who still feel that sulpharsphenamine has a place in the treatment of syphilis, the Council decided for the present to retain sulpharsphenamine in New and Non-official Remedies but to revise the description of the drug to give a more detailed warning concerning the dangers and limitations of its use. (Jour. A. M. A., November 12, 1932, p. 1688.)

THE "MODERN INSTITUTE" FRAUD

The Modern Institute, 381 Fourth Avenue, New York City, sold through the United States mails a so-called Triple-Action System for reducing persons suffering from obesity. Victims were obtained through advertisements published in magazines. The three preparations referred to in the advertisements were further described as: (1) "Triple-X Saline Salts, (2) "Triple-X Venus Cream," and (3) "Triple-X Baths." When these preparations were analyzed by chemists in the Food and Drug Administration of the Department of Agriculture, the Triple-X Saline Salts were found to contain tartaric and citric acids, soda, epsom salt and Rochelle salts. The Triple-X Bath Salts contained tartaric acid, soda and potassium phosphate. The Venus Cream was merely a vanishing cream with the odor of camphor. The directions were to put one-half teaspoonful of the Triple-X Saline Salts in a glass of hot water before breakfast. One of the Triple-X Bath Tablets was to be put in a bathtub containing water as hot as the victim could bear it, in which she was to remain fifteen minutes. The Triple-X Venus Cream was to be used as a massage cream. The amount of material sent in the "special introductory" treatment, for $1.95, was ridiculously small, and shortly after the victim received it she got a circular letter, signed "Florence Kingsley," explaining that she could not expect very much reduction from the small amount of material obtained in the introductory treatment. The main thing was to "keep up the treatment faithfully." The whole thing was an obvious and patent swindle, but it was necessary under the law for the government to go to considerable trouble and expense in introducing medical testimony to prove that it was a swindle. On July 24 Postmaster-General Farley issued a fraud order closing the mails to the Modern Institute, Inc., Modern Institute and Florence Kingsley. (Jour. A. M. A., October 7, 1933, p. 1170.)

President's Letter

TO the Members of the State Medical Association:

A year has passed and my tenure of office as president of this Association is nearly at an end. The experience has been a very pleasant one. I have met many old and made many new friends in my trips about the state in the interest of the organization.

I am impressed with the necessity for the medical profession to maintain a strong organization for the promotion of the best interests of the public health. It is my earnest hope that the future presidents of this organization will have the same fine spirit of loyalty and coöperation which it has been my pleasure to find among the officers and members.

I wish to bespeak for Dr. Savage, the president-elect, the same courtesy and good will that I have received from the membership, and wish him a most successful administration.

In closing, let me express my deep appreciation to all of you for your many kindnesses during the past year.

Yours very truly,



President,
Minnesota State Medical Association.

EDITORIAL

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AMEBIASIS AND A CENTURY OF PROGRESS

By now the national and perhaps international spread of amebic dysentery from the fair at Chicago is well known. The profession throughout the country should by now be ameba-minded and doubtless will have reason to stay ameba-minded for some time to come.

Usually from one to ten cases of amebic dysentery are reported yearly to our State Board of Health. A number are usually reported by the Mayo Clinic, which draws numerous out-of-state patients. This year there seemed to be no increase in the number of cases of amebiasis in the state until late this fall when six cases of amebic dysentery were reported from the Miller Hospital, Saint Paul, in a period of three weeks following the report of the first two cases on October 23. All of the six patients had been to Chicago a short time before becoming ill. Two additional cases have been since discovered in the families of these patients. Since June, eighteen cases have been reported by the Mayo Clinic, but only three of the eighteen are Minnesota citizens. The fact that there has been no increase in the reported cases of amebiasis throughout the state aside from the two localities mentioned seems significant. The conclusion seems justified that amebiasis is not being diagnosed.

This issue of MINNESOTA MEDICINE contains a communication from Dr. Ikeda calling attention to the cases of amebiasis detected at the Miller Hospital. A special article on the treatment of the disease by Dr. Rock, who has had considerable experience with the disease, also appears. The chronicity of the disease, its serious complications and its infectiousness simply emphasize the importance not only of diagnosing the acute case but of detecting carriers.

It seems remarkable that the presence of a serious epidemic emanating from Chicago should have been discovered in Minnesota before any news of the situation was received from the health authorities there. The questionnaire was of no use to those unfortunate individuals who contracted the disease as it contained no intimation of the nature of the epidemic. It does seem as though the medical profession should have been warned of the situation long before it was, so as to be on the lookout for symptoms of amebic dysentery, a warning which might have saved numerous lives.

CONCERNING PRIMARY TUBERCULOSIS

One of the encouraging aspects of medicine is that, every so often, some courageous soul comes forth with ideas and opinions quite opposite from currently accepted views which at first may call forth indignant protests but eventually lead to a sober revaluation of older concepts or to a heightened conviction that these older concepts remain sound. Such opinions are expressed in an article by Myers in this number of MINNESOTA MEDICINE (page 735).

One reads through the paragraphs answering the first seven questions and finds nothing that clashes with what has been taught and accepted

for many years with the exception that the author would classify as *disease,* on the basis of a biological reaction, what in the big majority of us amounts to a pathological accident of no consequence. In the eighth paragraph, however, appear assertions which must be seriously questioned. The doubtful tone in which immunity following primary tuberculous infection is referred to, its "uncertain and undependable" qualities arouse not indignant protest but thoughtful consideration. If it were true that positive reactions to intradermal tuberculin signify *only* first infection and that the adult type of tuberculosis represents second infection then Myers' thesis must stand. But where is the evidence to support this contention? Is it conceivable that those of us who go through life with only a positive Mantoux test or perhaps also with calcification in lung parenchyma or regional nodes or both have received only one infective dose with the tubercle bacillus? Isn't it more likely that in the present order of things with rapid transportation, congestion in urban centers, etc., that most of us have not one but many contacts, not too frequent nor too massive, with the tubercle bacillus? And if this be true, which appears reasonable, then it follows that though we become allergic, the malignant possibilities of allergy in most of us are completely obscured by acquired resistance to reinfection. This, of course, is fully substantiated by experimental evidence and the experience of the white race for generations. If the reverse were true our mortality rate from tuberculosis would be ghastly.

Myers' views regarding the reporting of those having only positive Mantoux tests to the health authorities raises pertinent questions. To report such individuals as having tuberculosis may seriously affect their obtaining employment and insurance. It may also have unpleasant reactions in one's social contacts. The theory behind the suggestion is sound, however, because area testing with tuberculin with x-ray examination of positive reactors, if done thoroughly and repeated over a period of years is bound to bring about a reduction in mortality and morbidity and the incidence of tuberculous infection as well. If this work is to be done by local health authorities it will mean a marked increase in their budgets. If sufficient funds are not available to investigate thoroughly and follow up reported positive reactors obviously a useless mass of data would be accumulated. Furthermore as Myers points out much remains to be done to induce certain physicians to report actual cases of clinical tuberculosis. With 30 per cent of such cases in this state being reported for the first time as deaths, it would seem futile at this time to attempt the reporting of those having only positive tuberculin reactions.

One is somewhat dismayed concerning the pessimistic views expressed by Myers regarding the efficacy of treatment for this first infective type of tuberculosis. No one will doubt that for the vast majority no treatment is necessary. But there is a certain number of children, small it is true, who have been heavily infected and whose home conditions preclude anything resembling hygienic living. The preventorium idea for these children must be sound providing, as it does, breaking contact and affording an environment for twenty-four hours a day which is as close to an ideally health producing one as is possible to achieve. Satisfactory evidence for this contention may never be forthcoming as the difficulties of observing groups similar in all respects for control purposes are obvious. It may be true that the arguments in favor of preventoria for the type of child alluded to, rest entirely upon an empirical basis but it is also true that empiricism backed up by close observation, wide experience and sound judgment is still a potent force today in the practice of medicine.

E. K. G.

FEDERAL EMERGENCY MEDICAL RELIEF

Considerable interest has been aroused in our state as a result of the announcement of the availability of Federal funds for medical expense in Minnesota.

According to a rule promulgated June 23 by the Federal Emergency Relief Administration state relief administrators must provide adequate medical service as well as food and fuel to those on the relief rolls. The rules adopted were published in full in the *Journal of the American Medical Association* (September 23, 1933, page 1026) and the Rules and Regulations as adopted in Minnesota were sent last month to each member of the State Association.

It should be understood that these funds are available for the payment of medical fees only in the counties which receive Federal aid. So far, twenty-nine counties have been receiving this aid, although some nine more have applied and will probably be added to the list in the near future. St. Louis County at present is not receiving any aid. Ramsey County and the city of Minneapolis receive supplementary Federal aid but are not included in the counties in which physicians will be able to collect for services rendered the indigent.

In the thirty counties receiving Federal aid the distribution of funds is handled by the County Emergency Relief Committee composed of two members of the Board of County Commissioners, two members of the Child Welfare Board and a local citizen of wide acquaintance. The State Board of Control sends a paid county relief worker to each such county to assure uniform operation.

It behooves a physician who resides in any

of the counties receiving Federal aid (listed below) and who wishes to participate in this emergency program to submit his name to the County Emergency Relief Committee and to familiarize himself with the regulations sent him by our State Medical Association secretary.

It is obviously impossible for the Federal government to pay all medical fees, even at a reduced rate, for those unable to pay their doctors' fees. Counties able to provide in large measure for the medical needs of their citizens are not included in the program, which is admittedly a temporary emergency measure. A physician signifying his willingness to accept discounted fees for his services makes such agreement between himself and the Board of Control. The fee schedule has not been officially approved by the State Medical Association, and it has not been deemed advisable for the local county society to approve the schedule. It should be understood that the program is a temporary emergency measure and the fee schedule, which apparently is greater than in some states and less than in others, is not a permanent arrangement.

The counties which at present (November 17) receive Federal aid are:

Aitkin, Anoka, Becker, Beltrami, Benton, Big Stone, Carlton, Cass, Chippewa, Clearwater, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Kittson, Koochiching, Lake, Lake-of-the-Woods, Mahnomen, Marshall, Mille Lacs, Norman, Otter Tail, Pine, Roseau, Stearns, Traverse.

THE HENNEPIN COUNTY TUBERCULOSIS ASSOCIATION'S NEW PLAN TO AID EARLY DIAGNOSIS

Great strides in the treatment and prevention of tuberculosis have been made in the past two decades. The death rate has been cut from 202 to 72 per hundred thousand, due, largely, to refinement in methods of treatment and a better understanding of the nature of the spread of the disease. But the incidence of tuberculosis is still very high. In the light of our present knowledge it is questionable whether we will make any further marked progress against the inroads of this disease on the basis of treatment and prevention.

The National Tuberculosis Association and many scientific centers are directing their efforts at this time to finding some vulnerable point of attack on the tuberculosis germ with the possibility of developing a direct method of exterminating it in the human body. However, until something of this kind is available, we must look for further reduction in the incidence and mortality rates of tuberculosis to the development of a more acute interest on the part of physicians and the public, in the early detection of the disease.

Early diagnosis of tuberculosis presents an opportunity for the profession to do much toward further reducing the death rate and lowering the incidence of the disease. Much confusion prevails in the minds of the public, and, to a large extent, in the minds of the profession, relative to the merits of the use of tuberculin tests in the discovery of tuberculosis. Much of the present erroneous conception is due to early reports of the large percentage of the population which would react positively to the tuberculin test. The statistics which have formed a basis for these obviously wrong conclusions were based on results of testing with impure tuberculin which gave many foreign protein reactions and was not particularly specific for tuberculosis. Today with the refined Old Tuberculin and the more delicate methods of testing, such as the Mantoux test, in dilutions 1-1000 or 1-500, a positive reaction to tuberculin has definite significance, and furnishes one of the best and surest methods we have in the early detection of this disease.

A limited survey in Hennepin County disclosed that only a relatively small percentage of physicians have been using Old Tuberculin in their offices as a method of diagnosis. At the same time, statistics show that a very high percentage of the cases of tuberculosis reported are far advanced when discovered.

In an effort to stimulate interest in the early diagnosis of tuberculosis, the Hennepin County Tuberculosis Association has developed a service to the physicians of Hennepin County in which they have furnished to the doctors a tuberculin syringe, with needle, and the diluted Old Tuberculin in a sterile vial, thus placing in their hands the facilities necessary for making the Mantoux test. This service includes delivery to the physicians in their offices a fresh supply of diluted tuberculin once every two weeks, which, even without refrigeration, insures physicians a normally reacting tuberculin.

Simple but complete instructions are being given physicians regarding the method of application and of reading the Mantoux test, and it is planned by the Tuberculosis Association that, from time to time, interesting material relative to the value and importance of Mantoux testing and its relation to tuberculosis will be furnished the physicians of Hennepin County. As soon as the doctors show that they are interested in using the tuberculin test, the Association will put on a country-wide educational campaign calling the attention of the public to the importance of the tuberculin test and the x-ray in the early diagnosis of tuberculosis.

The Minneapolis Health Department and Glen Lake Sanatorium are coöperating in carrying out this very meritorious program which has the endorsement of the County Medical Society.

It is to be hoped that this type of service will be made available to practising physicians in

other counties, and possibly, in time, throughout the state by our tuberculosis associations.

Great credit should go to the Hennepin County Tuberculosis Association, which is entirely supported by the sale of Christmas seals, for initiating and carrying on what promises to be one of the outstanding forward steps in the age-old fight against this disease which has resisted so tenaciously every effort on the part of science to eliminate it. N. O. P.

WILLIAM BEAUMONT

In view of this year marking the centennial of the publication of William Beaumont's "Experiments and Observations on the Gastric Juice," it seems fitting to record at this time an apparently unknown Beaumont item, and to list the Beaumont material in the library of the Ramsey County Medical Society.

Some years ago Miss Caroline Beaumont of this city presented to the late Dr. Arthur Sweeney a copy of the second edition of Beaumont's work, Burlington, 1847, and two copies of a pamphlet of twenty-four pages, 18.5 by 11.5 cm. with the following title:

ON DYSPEPSIA

AN ADDRESS
DELIVERED BEFORE THE
CLINTON COUNTY MEDICAL
SOCIETY
AT THEIR
ANNUAL MEETING
June 28, 1831

BY S. BEAUMONT,
President of the Society.

PUBLISHED BY ORDER OF THE SOCIETY,
PLATTSBURGH:
F. P. ALLEN, PRINTER.
1831.

The second edition of Beaumont's work had an additional interest in that it was a presentation copy, having on the second blank leaf the inscription "For J. I. Beaumont from his father, S. Beaumont."

In the pamphlet above described Samuel Beaumont makes no reference to William Beaumont or to St. Martin. This is difficult to account for unless he did not realize at the time the importance of the observations. Mrs. O'Brien states that her father remembered St. Martin, having seen him in Plattsburgh, and having looked into his stomach and also held the basin when observations of the fistula were made. J. I. Beaumont was then a small boy.

The above items were presented by Doctor Sweeney to the Ramsey County Medical Society, which also has a copy of the first edition of Beaumont's "Observations," Plattsburgh, 1833, and the recent reprint of the same. *The Medical Recorder* for 1825 containing the preliminary account of St. Martin's injury may also be found in our library.

Miss Beaumont, now Mrs. Henry J. O'Brien, is the daughter of the Joseph I. Beaumont above mentioned. J. I. Beaumont was born in Plattsburgh in 1827 and died in Saint Paul in 1904.

The Society also has two ambrotypes of Dr. Samuel Beaumont and his wife, presented by Mrs. O'Brien, and photographs of two portraits of her grandparents painted at an earlier date, the original portraits being in Mrs. O'Brien's possession.

The second copy of the pamplet mentioned above was acquired from the Ramsey County Medical Society by Dr. John F. Fulton, Professor of Physiology at the Yale Medical School.

J. M. Armstrong, M.D.

MISCELLANEOUS

DOCTOR HOWARD McILVAIN MORTON

The Minnesota Academy of Ophthalmology and Otolaryngology on October 13, 1933, bade farewell to Dr. Howard McI. Morton. He it was who had founded the organization and had been its most colorful member. When one first heard about him he was impressed by his middle initial; when he saw him he noted the black tie with wing collar, the starched shirt, and the vest that was of different cloth than the coat. The way he held his cigar, and his confident manner suggested an acquaintance with important places and people. When we heard him speak for the first time we worried a little about his ability to complete properly some of the long sentences he likes to start, but as happens so often, we worried for naught. After that we looked forward to his dissertations, and were not often disappointed, for at almost every meeting of the Academy he discussed at least one paper. No one else spoke in the polished, scholarly style that he commanded, and few others could relate so many personal experiences with European clinics and professors in his field of ophthalmology.

These are impressions of one who had only a passing acquaintance. Others, more intimate with him, have spoken of his great capacity for making friends, and this is quite apparent, for he does have a host of them. We know, too, he is sincere when he says he loves his friends.

Dr. Morton is giving up active practice, and is going to New Jersey, where he will continue his writing and his literary investigations.

C. W. R.

—*Bulletin* Hennepin County Medical Society, Oct. 25, 1933.

OF GENERAL INTEREST

Dr. Vernon L. Hart, formerly surgeon in charge of the Division of Orthopedic Surgery of the University of Michigan and the Dayton Clinic, is continuing the practice of the late Dr. Emil S. Geist in Minneapolis.

Dr. Merlyn J. Lindahl has moved from Winthrop, where he has been in practice for the past five years, to Jasper, Minnesota, where he will engage in a general medical and surgical practice.

Dr. Earl R. Carlson, formerly of Minneapolis and a graduate of the University of Minnesota, has announced the opening of a country school in Sunny Ridge, New Rochelle, New York. Dr. Carlson specializes in neurology and training of the birth injured.

Dr. John A. Pratt of Minneapolis has returned from Dallas, Texas, where he was the guest speaker before the Dallas Academy of Ophthalmology and Otolaryngology. Dr. Pratt gave a dry clinic in the afternoon of the meeting and in the evening delivered two papers, "Revaluation of Intranasal Surgery" and "The Endocrines in Otolaryngology."

Dr. A. E. Olson of Duluth is one of the newly appointed regents of the University of Minnesota. Dr. Olson was born in Duluth, attended the grade schools in that city and received his pre-medical education at the University of Minnesota. His M.D. was obtained at the University of Illinois, Chicago, in 1920. After taking his internship at Cook County, the Chicago Lying-In and the Grant Hospitals, Dr. Olson began practice in Duluth in 1922.

The Hennepin County Tuberculosis Association, with the endorsement of the Hennepin County Medical Society, is the author of a plan to promote the discovery of more cases of tuberculosis in the early stages of the disease.

Minneapolis physicians will each receive a tuberculin syringe and, every two weeks, a supply of fresh Mantoux testing solution. The syringe is the gift of the Hennepin County Tuberculosis Association. Physicians will be urged to coöperate in seeking the early case by routinely tuberculin testing all patients.

In a letter to physicians, announcing the plan, it was pointed out that of all cases of tuberculosis reported, 50 per cent of these individuals are dead within six months.

At the Abbott Hospital staff meeting in November Dr. David Siperstein gave an informal talk on medical conditions in London. He showed there some of the books which he brought back with him. One was a copy of Osler's "Æquanimitas" inscribed by Osler to Sir Ronald Ross, who established the fact that malaria is carried by the Anopheles mosquito. There were also two books from the original Sydenham library: one, the works of Hippocrates, and another on the medieval plagues. A bookplate printed in early Latin script has been translated here with some difficulty as follows:

"E. C. Van Leersum owns this book. I here earnestly pray to all in the name of Christ that no wicked one take this book from me, neither by force nor by theft nor for any false hunger because to me the greatest wealth is not so precious as my dear books."

It was found that the leaves in the books of Mr. Van Leersum's library had never been cut.

PLANS FOR A CHRISTMAS HOLIDAY CLINIC AT THE UNIVERSITY OF MINNESOTA

Plans are being drawn, with the hope of offering a two-day clinic, free, to the physicians of the State, at the University of Minnesota, during the week of the Christmas holidays. It is expected that a program covering subjects of interest to practitioners can be completed during the month of November and upon completion a copy will be sent to the secretary of each local medical society. Information will also be furnished the secretary of the State Medical Association.

A. M. A. SCIENTIFIC EXHIBIT

Application blanks are now available for space in the Scientific Exhibit at the Cleveland Session of the American Medical Association, June 11 to 15, 1934. The Committee on Scientific Exhibit requires that all applicants fill out the regular application form and requests that this be done as early as convenient.

The final date for filing applications is February 26, 1934. Any persons desiring to receive an application blank should address a request to the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago, Illinois.

RESEARCH WORK ON GOITER

The American Association for the Study of Goiter, for the fifth time, offers Three Hundred Dollars ($300.00) as a first award, and two honorable mentions for the best essays based upon original research work on any phase of goiter presented at their annual meeting in Cleveland, Ohio, June 7, 8, and 9, 1934. It is hoped this will stimulate valuable research work, especially in regard to the basic cause of goiter.

Competing manuscripts must be in English, and submitted to the Corresponding Secretary, J. R. Yung, M.D., 670 Cherry St., Terre Haute, Ind., U. S. A., not later than April 1, 1934. Manuscripts received after this date will be held for the next year or returned at the author's request.

The First Award of the Memphis, Tenn., 1933 meeting was given Anne B. Heyman, A.B., M.S., University of Michigan, Ann Arbor, Mich., "The Bacteriology of Goiter and The Production of Thyroid Hyperplasia in Rabbits on a Special Diet." Honorable mentions were awarded J. Lerman, M.D., and W. T. Salter, M.D., Huntington Memorial Hospital, Boston, Mass., "The Calorigenic Action of Thyroid and Some of its Active Constituents," Prof. Dr. Stefan Konsuloff, Sofia, Bulgaria, "Experimental Studies on Etiology of Goiter."

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

SUPREME COURT DECLARES HEALTH AUDIT SERVICE UNLAWFUL

John Granger *vs.* A. W. Adson, J. F. Du Bois, E. J. Engberg, E. T. Sanderson, C. L. Sherman, Ivar Sivertsen, and G. B. Weiser, individually and as members of the State Board of Medical Examiners.

On November 3, 1933, the Supreme Court of Minnesota, in a very strongly worded opinion by Justice Loring, held that a layman could not conduct a health audit service furnishing urinalyses and blood pressure tests through the medium of employing a licensed physician to do the actual work. The Supreme Court of Minnesota held:

1. The plaintiff, a layman, in conducting a "health audit" for a fee for which he furnished his subscribers with the results of urinalyses and blood pressure tests and either himself advised, or passed on to the subscriber advice from the pathologist who made the urinalyses, as to whether the results showed a normal or abnormal state of health and whether the subscriber should see a physician, in some cases advising as to

diet, exercise and habits, was practicing medicine unlawfully in violation of Sec. 5717 Mason's Minn. St., 1927.

2. In so doing he is practicing the science of healing in violation of Sec. 5705 Mason's Minn. St. 1927, which defines the science as including the diagnosis or analysis of the condition of human health.

3. Plaintiff's contract with his pathologist was illegal and in violation of statute and the public policy of the state.

In August, 1932, the plaintiff started an action in the District Court of Hennepin County, seeking an injunction to restrain the State Board of Medical Examiners from in any way interfering with the conduct of his business. His business consisted of periodical urinalyses and blood pressure tests. A licensed physician was in the employ of the plaintiff. A charge of ten dollars per year was made to the "subscriber." Judge Reed of the District Court sustained the demurrer interposed by the Medical Board and the order of Judge Reed was affirmed by the Supreme Court.

The Court among other things stated:

"Advising the subscriber for a fee as to certain improved habits of diet, exercise or living, although not accompanied by any medical prescription or treatment, is a violation of Sec. 5717." (Medical Practice Act)

The Court also held that the plaintiff was engaged in the diagnosis or analysis of the condition of human health and as such constituted a violation of the Basic Science Law. Sec. 5705 Mason's Minnesota Statutes 1927.

The Court summed up the entire matter by stating that the law intends:

"That the patient shall be the patient of the licensed physician, not of a corporation or layman. The obligations and duties of the physician demand no less. There is no place for a middleman."

This decision is of tremendous importance to the medical profession throughout the State of Minnesota and the United States. It will go a long way towards confining the practice of medicine to those who are licensed.

In addition to Justice Loring, who wrote the opinion, the following members of the Supreme Court concurred therein: Chief Justice John P. Devaney, Justice Andrew Holt, Justice Homer B. Dibell, Justice Royal A. Stone, Justice Clifford L. Hilton and Justice L. M. Olsen.

The State Board of Medical Examiners was represented by Harry H. Peterson, Attorney General, and F. Manley Brist, Special Assistant Attorney General. The State Board of Medical Examiners wish to acknowledge the splendid coöperation shown the Board in the defense of this case by Attorney General Peterson.

MINNESOTA SUPREME COURT UPHOLDS BASIC SCIENCE BOARD

Re Shenk *vs.* Minnesota State Board of Examiners in the Basic Sciences.

On October 6, 1933, the Supreme Court of Minnesota, after a reargument, upheld the Basic Science Board in its refusal to issue basic science certificates to naturopaths who were practicing in Minnesota in May, 1927, when the law went into effect.

William W. Shenk, who has held office in the naturopathic organization, and who claimed that he was lawfully practicing naturopathy in Minnesota in 1927, brought the action in the District Court of Hennepin County to compel the Basic Science Board to issue him a certificate without examination. Judge A. W. Selover sustained a demurrer interposed by the Basic Science Board, and thereafter an appeal was taken to the Supreme Court. On March 3, 1933, the Supreme Court affirmed the action of the District Court by a vote of five to two, Chief Justice Wilson and Justice Loring dissenting. Shenk petitioned the Court for a rehearing, which was granted, and the case was reargued on May 17, 1933. At the time of the last decision Chief Justice Devany, who succeeded Chief Justice Wilson, took no part in the decision of the case due to the fact that the present Chief Justice was not a member of the Court at the time the case was submitted.

In referring to Shenk, the Supreme Court stated:

"We now decide that he was practicing medicine and that such practice was unlawful. Hence he is not entitled to the benefit of the provisions of Section 8 concerning registration without examination."

The Court further stated that naturopathy, as set out in the petition constitutes the practice of medicine. This decision will enable the various law enforcement agencies of the State of Minnesota to block effectively the unlawful practice of healing by those who are not duly registered or licensed.

COMMUNICATION

November 8, 1933

To the Editor:

May it not be timely to again call the attention of the profession in Minnesota to the occurrence of Amebiasis in this state, which is not as uncommon as is the general impression, by briefly mentioning our experience with this disease?

During the past twenty days, five cases of acute amebic dysentery were admitted to this hospital. In three of the cases, the finding of the endameba histolytica in the stools was a distinct surprise to the clinician. In two others, the experience with the first two was of help clinically and the examination of warm stools for amebæ was requested upon admission.

The first of the five is from Philadelphia, two are resident of Saint Paul and the last of Minneapolis. All of them, however, spent several days or more visiting at the World's Fair in Chicago, during the summer.

The practitioner may well keep in mind the possibility of amebic dysentery in cases of acute diarrhea with blood and mucus, and request at once the examination in such cases of the stools by a competent individual. If no reliable laboratory facilities are available, the advisability of the administration of emetine hydroehloride, for two or three days, should be considered, as a diagnostic measure, since the stools under this treatment, together with proper dietary régime, will become normal within a few days and temporarily, at least, free of the offending organisms.

Amebiasis is no longer to be considered a local disease. Its potentialities as a systemic disease are well illustrated by another patient who came under our observation a few months ago, complaining of chills and fever and vague pneumonic signs in the base of the right lung but without any history of intestinal disorders, at any time in his life, and in whom, at autopsy, the intestinal lesions were found to be minimum, in spite of amebic abscesses in the liver, brain and lungs and amebic infarcts in the lungs, spleen and the small intestine.

It is felt that many of the cases of the so-called intestinal "flu" and summer diarrhea, and the like, are being treated without the proper stool examination. A possibility of, at least, some of these cases being due to infection with the *endameba histolytica*, should be suspected and the search for the organism in stools be encouraged.

Since, also, the symptom-free cases of this infection or the "carriers" are an epidemiological problem of far reaching significance, it should be doubly important that the profession be again reminded of the ever present possibility of this disease, at this time.

KANO IKEDA, Pathologist,
The Chas. T. Miller Hospital, Saint Paul, Minnesota

A FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Group Practice and the Medical School

THE effect of a general system of group practice upon medical education did not figure much in public discussions of the Majority Report of the Committee on the Costs of Medical Care at its release last fall.

More immediate and obvious considerations occupied critics and proponents at that time.

This very important aspect of the question was discussed at length, however, by Father A. M. Schwitalla, Dean of St. Louis University School of Medicine and himself a member of the Committee on the Costs of Medical Care, before the Minneapolis session of the meeting of the Association of American Medical Colleges, October 31. In a very scholarly and impressive paper Father Schwitalla outlined clearly the effect that the radical changes proposed must necessarily have on medical education.

With group practice as proposed by the Majority Report in operation, the general practitioner would disappear from the picture. With him would go the requirement for a broad foundation of medical knowledge now insisted upon by all first class medical schools as a basis both for general practice and the specialties.

The evils to be observed in specialism under our present system have drawn the anxious and disapproving attention of physicians and school men. Plans are under way in many county and state organizations for some machinery to curb and control it.

The picture drawn by Father Schwitalla of a future practice of medicine given over entirely to specialism and open to all the evils inherent in such a system is disquieting.

The wisest medical observers today earnestly advise not the expansion, but the limitation of specialties to those with qualifications that meet definite standards to be set by the profession itself. They regard this limitation and standardization of specialists as a great necessary reform comparable to the reform of medical education which is one of the glories of the American medical profession.

As an educator, Father Schwitalla sees an impossible situation confronting both the schools and the practicing physician born of the necessity for every medical man to become a specialist of some kind if he wants to survive. Such a "reform," he declares, will open the door to charlatanry and inferior practice.

"It was unfortunate," said Father Schwitalla, "that the Minority Report was of necessity so incomplete. With a very short time to prepare the report, its signers stated their general attitude definitely and forcefully. They were not able, however, to outline in detail the results they foresaw so well of any such wild recasting of medicine."

There is a wide gulf, Father Schwitalla remarked, between the medical viewpoint and the sociologist's viewpoint, the latter being evident in the report of the majority.

"We are sometimes told," he said, "that we must allow the sociologist to take the lead; that we must fall into step with him or fall into the rear guard. The enterprise and facility of the social worker is quite frequently held up in marked contrast to what is called medical complacence and smugness.

"It is true, no doubt, that there is a lag in medicine between the newest advances in knowledge and the general application in practice of these advances.

"Certainly there is no lag between new ideas and prompt practice among the sociologists. The sociologist is as quick as popular opinion to seize upon a new idea and to put it to the test. And he is likely to shift just as quickly.

"Medicine is asked to accept new conclusions with the same precipitateness as the social worker and is met with impatience if it exhibits a resistance born of innate realism and conservatism.

"Medicine cannot hold itself aloof from social conditions, of course. It has its own characteristic contribution to make. But it cannot hope to accomplish anything if its aims are identified with those of the social worker."

OBITUARY

Mrs. Louis B. Wilson

Relatively few mortals have the ability and industry to become leaders in their vocations. In the passing of Mrs. Louis B. Wilson, the occasion arises to record a career which was outstanding in the field of medical literature.

Annie Maud Headline was born near Faribault, Minnesota, and graduated as a nurse at the Presbyterian Hospital in Chicago. In 1889 she married Dr. Ernest J. Mellish. Following the death of Dr. Mellish in 1905, Mrs. Mellish took up medical library and editorial work at the Augustana Hospital in Chicago.

In 1907 Mrs. Mellish became associated with the Mayo Clinic and took charge of developing the Clinic library. Until recently she had charge of the publications of the Clinic. Fortunately, Mrs. Mellish has left us the results of her extensive experience in medical publications in the form of a book entitled "The Writing of Medical Papers," which has appeared in three editions. This small volume may be followed as a standard by the members of the medical profession and contains many valuable suggestions on the writing of medical papers.

In 1924 Mrs. Mellish married Dr. Louis B. Wilson of Rochester, Minnesota. In addition to her husband she is survived by two brothers, Charles and G. F. Headline of Faribault, and a sister, Mrs. Ida C. Denny of Basin, Wyoming. Her death occurred on November 6, 1933, following a prolonged illness.

Dr. David Graham

1859-1933

Dr. David Graham, aged seventy-four, pioneer of West Duluth and president of the Duluth Hospital in West Duluth, died Saturday afternoon at his home after a lingering illness. He was born in Florence, Ont., was graduated from the Detroit College of Medicine and settled in West Duluth forty years ago.

Dr. Graham was a member of the Minnesota state legislature in 1903 and 1909, was a member of the St. Louis County Medical Society, the Minnesota State Medical Association, the American Medical Association and was a past master of Euclid lodge, No. 198, A. F. & A. M. He was a member of the Scottish Rite and of Aad temple, Nobles of the Mystic Shrine.

Dr. Graham is survived by his wife; one son, Dr. Reginald D. Graham, West Duluth; one sister, Frances, Manitoba; three brothers, Joseph, Niagara Falls, N. Y., Dr. Robert Graham, Duluth, and Charles Saskatchewan; and four grandchildren.

Dr. Robert Stewart Bole

1860-1933

Dr. Robert Stewart Bole, since 1884 a practicing physician in Saint Paul and for the past thirty years associated with the Saint Paul City Railway Company, died Saturday, September 16, 1933, at Saint Luke's Hospital.

Dr. Bole was born at Ryegate, Vermont, March 24, 1860, the son of a Presbyterian minister. In 1862, his parents moved back to Scotland, their former home, and he spent his early childhood there and, later, in Belfast, Ireland. After seven years, they returned to the United States, and he attended public school in West Barnet, Vermont, and the Peacham Academy. When he was sixteen, he went to Boston and received training as an apothecary. He spent two years on the United States training ship for naval officers, Portsmouth, which made an extended voyage by sail and touched the Continental and Mediterranean ports. His medical education was completed at the University of Vermont.

He entered general practice in Saint Paul in 1884. Ten years later he married Katherine Fox, who died December 31, 1930. Dr. Bole was a member of the Ramsey County, Minnesota State and the American Medical Associations.

He is survived by a brother, James Bole, of Bozeman, Montana; two sisters, Mrs. Margaret Hamilton and Miss Marion Bole, of Waterbury, Connecticut, and four grandchildren, Robert Howard, Marianne, Patricia and Katherine Maas, all of Saint Paul, Minnesota.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCOST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of December will be as follows:

December 6—Tuberculin Testing.
December 13—Hand Infections.
December 20—Sanitary Achievements.
December 27—Heredity and Cancer.

STATE MEETING, 1934

Several program departures are in contemplation for the 81st annual meeting of the Minnesota State Medical Association to be held July 16, 17 and 18, in Duluth.

If present plans materialize morning sessions will be devoted exclusively to demonstrations, clinics and exhibits, the Committee on Scientific Assembly announced following its second meeting held Saturday evening, November 4, at the Lowry hotel in Saint Paul. Following these plans the papers will be read during afternoon sessions and all will relate in some manner to the demonstrations or exhibits given in the morning.

A tentative list of subjects both for demonstrations and papers has already been drawn up. When this list is complete the committee plans to send it to all members of the association for their criticism and suggestions.

The suggested list now includes toxicology (medicolegal, industrial an dhouschold); encephalitis (with special reference to the epidemic in St. Louis); pure food; the anemias; traumatic surgery; heart (with exhibit, clinic and possibly movies); coronary disease; gastritis with possible x-ray movie showing rugæ of the stomach; diabetes; cancer; artificial fever treatment; symposium on the endocrines (exhibit and papers); differential diagnosis of obstructive and interhepatic jaundice; tularemia; brucella abortus; diarrheas; amebic dysentery; newer concepts of nutrition and vitamins; agranulocytopenia as a result of use of barbiturates; arteriosclerosis of the nervous system; manifestations and treatment; squint; tumors of the nose and throat; carcinoma of the larynx; plastic surgery in facial paralysis; late results of thoracic surgery in pulmonary tuberculosis; gastrointestinal surgery; physiology and pathology of the liver; fractures; bone lengthening in flat foot conditions; bone tumors; peripheral vascular disease; diag-

nosis of the unconscious patient; preventive inoculation and serum treatment of the acute infectious fevers; syphilis; trichinosis; pneumoconiosis or silicosis and actinomycosis.

A number of distinguished out-of-state speakers will be invited to speak and take part in demonstrations and clinics, the committee says. In addition there will be social events including the golf tournament, alumni and fraternity gatherings.

MINNESOTA RADIOLOGICAL SOCIETY

The Minnesota Radiological Society held its fall meeting at the St. Paul Athletic Club, St. Paul, Minnesota, November 11, 1933. The following program was presented:

1. Osteochondritis Juvenilis Deformans (Perthe's Disease). Report of cases.
   W. L. Burnap, M.D., Fergus Falls, Minnesota
2. Observations from a Clinical Tour
   M. A. Shillington, M.D., St. Paul, Minnesota
3. Pneumonia in Young Infants Associated with the Aspiration of Various Oils
   Kano Ikeda, M.D., St. Paul, Minnesota
4. The Roentgen Diagnosis of Placenta Previa
   Walter H. Ude, M.D., Minneapolis, Minnesota
5. The Improvement of Chest Radiography
   R. B. Wilsey, M.A., Rochester, New York
6. Motion Picture Demonstrating Manufacture of X-ray Film
   L. A. Carlson, St. Paul, Minnesota
7. The American Registry of Radiological Technicians
   George M. Landau, M.D., Chicago, Illinois

ADDRESS

The Value of Ventriculography and Encephalography to the Brain Surgeon
Alfred W. Adson, M.D., Rochester, Minnesota

SOUTHWESTERN MINNESOTA SOCIETY

The Southwestern Minnesota Medical Society held the annual meeting at the Thompson Hotel, Worthington, Minnesota, Tuesday, November 7, 1933, at 7:00 P. M.

At the business meeting of the Society the following officers were elected for the coming year: President, Dr. H. DeBoer, Edgerton; vice president, Dr. W. H. Halloran, Jackson; secretary-treasurer, Dr. E. G. McKeown, Pipestone.

Seven doctors were elected to membership in the Society: Dr. B. J. Bouquet, Adrian; Dr. D. J. Halpern, Brewster; Dr. Robert E. Priest, Worthington; Dr. E. M. Sorensen, Round Lake; Dr. Rudolph E. Johnson, Worthington; Dr. S. W. Watsen, Jeffers, and Dr. C. A. Williams, Pipestone, Minn.

The following program was presented:

"Adenomyomata and Endometriomata with Report of Cases"—Dr. W. J. Benjamin, Pipestone, Minn.

"Case Report"—Dr. H. C. Doms, Slayton, Minn.

"Tuberculin Testing Among School Children"—Dr. Wm. P. Ross, Worthington, Minn.

"Medical Economics"—Dr. C. L. Sherman, Luverne, Minn.

A social time was then held in honor of Dr. C. P. Dolan, Worthington, who has been in practice for fifty-seven years. Drs. C. L. Sherman and W. R. Brock, in honoring Dr. Dolan, gave very interesting talks, to which Dr. Dolan very pleasingly responded. Forty-one members and friends of the Society were present at this meeting.

The Society has held three special meetings this fall as follows:

October 9, 1933, Fulda, Minn.: Dr. A. B. Rivers, Rochester, Minn., "New Developments in the Medical Treatment of Ulcers"; Dr. H. K. Gray, Rochester, Minn., "Evaluation of Surgery in Gastric Carcinoma."

October 20, 1933, Fulda, Minn.: Dr. Owen H. Wangensteen, University of Minnesota, "The Recognition of Acute Abdominal Disorders with Comments on Therapy."

October 26, 1933, Heron Lake, Minn. Drs. Adison, New and Masson presented a very interesting program on "Abdominal Surgery and Gynecology." This was presented with lantern slides and moving pictures.

E. G. McKeown, *Secretary-Treasurer.*

WOMAN'S AUXILIARY

President—Mrs. A. A. Passer, Olivia
Chairman Press and Publicity—Mrs. Glen R. Matchan, Minneapolis
Editor—Mrs. S. H. Baxter, Minneapolis

The second Board meeting of the year was held at the Commodore Hotel, St. Paul, October 20, at ten o'clock, with Mrs. A. A. Passer, state president of the Auxiliary, presiding. Forty members and four guests attended the meeting.

After the business of the day a luncheon was served, followed by interesting table talks by Dr. N. O. Pearce, president of the Minnesota State Medical Association, and Dr. E. A. Meyerding, secretary of the State Association.

Of interest to the group was the announcement and showing of prizes to be given in the State Radio Contest to be conducted by the State Auxiliary for students in the high schools of Minnesota, the subject to be: "Youth—the Hope of Tuberculosis Control." The first prize is a plaque appropriate to the subject to be placed in the school room of the pupil who wins it. Ten individual prizes will be awarded to those whose papers are deserving of merit.

Mrs. James Blake, president of the National Auxiliary, and Mrs. A. A. Passer, president of the State Auxiliary, attended the National Auxiliary meeting in Chicago, October 27.

HENNEPIN COUNTY

A social meeting was held October 6 at the home of Mrs. Carl Waldron. In the receiving line as honor guests were Mrs. James Blake, president of the National Auxiliary, Mrs. A. A. Passer, president of the Minnesota State Auxiliary, and Mrs. Martin Nordland, president-elect of the State Auxiliary. Many new members were welcomed and a delightful musical program was given by Mrs. Agnes Griswold Teasdale, accompanied by Mrs. Eleanor Freemantel.

Mrs. Frederick Erb, president of the Hennepin County Auxiliary, announced two projects to be undertaken.

(1) The first project is a radio contest similar to that to be carried on throughout the State Auxiliary. Participants in this contest are to be students in high schools of Hennepin County. The subject is to be the same as that chosen for the state contest: "Youth—the Hope of Tuberculosis Control." Mrs. C. B. Wright is chairman for the contest, which will end in November. The prizes for this contest are a choice of a two weeks' vacation in a scout or similar summer camp or a wrist watch for the boy and girl who send in the best essays on the subject.

(2) The second project to be undertaken is the sponsoring of a sale of articles made by the patients of the Occupational Therapy department of Glen Lake Sanatorium with Mrs. Stephen H. Baxter acting as chairman. The Dayton Company has generously loaned us space on the fourth floor, near the Tea Rooms, for three days—Wednesday, Thursday and Friday, November 21 to 24. The articles to be sold are all made by the patients, and the money received goes directly to

them. This is the only opportunity these people have of making money to buy many of the necessities and a few of the luxuries they need. The articles are beautifully made and very reasonable. They took fifty first prizes at the State Fair.

As a group, the Auxiliary on November 17 helped with the preparation and mailing of the Tuberculosis Christmas seals.

Hennepin County is having an exceptional year in the matter of interest and attendance at meetings. On November 3 our regular business meeting was held in the parlors of the Hennepin County Medical Society. After the meeting Mrs. Blanche Jones talked of her work as policewoman in Minneapolis, and a most beautiful musical program was given by Mrs. Ann O'Malley Gallogly.

Our annual Christmas party is planned for December 1 at the home of Mrs. G. T. Nordin, with Mrs. W. E. Patterson in charge of the program.

WEST CENTRAL

A regular meeting of the Auxiliary to the West Central Medical Society was held at Morris, October 11, jointly with the medical group.

Mrs. E. T. Fitzgerald of Morris presided at the business session following the banquet. New officers elected are: President, Mrs. E. A. Eberlin, Glenwood; secretary-treasurer, Mrs. A. F. Geisen, Starbuck.

WRIGHT COUNTY

The annual meeting of the Wright County Medical Society and Auxiliary was held on Tuesday, October 24, at the home of Dr. and Mrs. J. J. Catlin, Buffalo. Twenty-three members were present.

Dr. Moses Barron gave a lecture on "Anemias," illustrated by slides. Officers of the Auxiliary include: Mrs. Leslie Bendix, Annandale, president; Mrs. L. Harriman, vice president; Mrs. J. J. Catlin, Buffalo, secretary-treasurer.

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

STATED MEETING HELD OCTOBER 5, 1933

The President, Dr. Kenneth Bulkley, in the Chair

THE TREATMENT OF BRANCHIAL FISTULÆ WITH SCLEROSING FLUIDS

A CASE PRESENTATION AND REPORT

E. C. Robitshek, M.D., F.A.C.S.

An apology is offered, for the remarks made herewith, because of their elementary nature and because much is quoted verbatim from the literature. I am hopeful, however, that your interest in the now simple and successful treatment of these cases, as against the previous tedious, difficult, and not always successful surgical operative method, may be sufficiently aroused to repay you for your kind indulgence.

According to Kaufmann, in early embryonal life, four pouches are developed between the gill clefts in the lateral pharyngeal walls. These pouches, but more especially the clefts, become or participate in the formation (in the first) of the Eustachian tube, the middle ear, external auditory canal and the pinna. The second pouch forms the receptacle for the pharyngeal tonsil. From the third pouch, the thymus is developed, and the fourth corresponds to the priform sinus in the anlage of the lateral lobes of the thyroid. Part of these tracts may remain open, but more especially those connected with the third gill.

Fistulous channels remain with an external or internal opening—called blind, incomplete, external or internal, or complete with both openings. They are called congenital cervical fistulæ, gill or cervical gill fistulæ, gill cleft fistulæ or simple branchiogenic fistulæ.

The external orifices of these fistulæ are usually indicated by a nodule of skin and are situated, according to Sutton, in the line of the anterior border of the sternomastoid muscle opposite the angle of the jaw, the thyrohyoid space and sternoclavicular articulation. The internal orifices are either in the region of the tonsil or the sinus piriformis.

The history often reveals whether the sinus dates from birth. However, it frequently happens that a branchial cleft cyst persists in the deeper part for years after birth and then gradually works its way to the surface, finally penetrating the skin and forming a sinus. Actinomycosis sinuses are situated in a hard board-like tissue, are usually multiple, and do not extend very deeply. Tuberculous sinuses arise from glands or tuberculous foci in the bone, generally in the vertebral column. Such sinuses are usually located in the posterior portion of the neck, while congenital ones usually appear in the middle of the neck or in the region of the sternomastoid muscle.

The secretion from a sinus affords additional diagnostic aid. Assuming that diagnosis of a congenital sinus is established, it still must be determined whether the case is one of branchial cleft sinus or whether it is a so-called median sinus arising from the thyroglossal duct. If it opens in the midline and it runs along the course of the middle lines toward the hyoid bone, its origin in the thyro-glossal duct is quite certain. If it opens on the side it is usually a branchial cleft sinus. To determine if a sinus is complete, and, if so, the location of the internal opening, one should inject some colored solution, such as methylene blue, into the external orifice. In case of thyroglossal duct sinuses, the fluid will appear at the foramen cecum in front of the epiglottis. In case of a branchial cleft sinus the solution will appear at the lateral pharyngeal wall. Sodium iodide or lipiodol should be injected into the sinus and its course followed in a skiagram. However, I find a bismuth emulsion, such as Beck's paste, injected for this purpose of more value in assisting in outlining the course of such a tract. These fistulæ are lined with a secreting epithelium which must be removed or destroyed, or recurrence will take place. Removal by surgical operation consists in an exact anatomic dissection of some difficulty, owing to the adherence of the wall of the tract to the sheath of the great vessels and the difficulty of following the tract to its ultimate termination in the wall of the pharynx.

Treatment of these tracts and fistulæ with sclerosing solutions was undertaken as far back as 1829 with little or no success. My attention was drawn to this subject in an article entitled "The Use of Sclerosing Solutions in the Treatment of Cysts and Fistulæ," by Drs. E. C. Cutler and R. Zollinger, as published in the *American Journal of Surgery*, Vol. 19, No. 3, March, 1933. They reported several cases of cervical fistulæ and pilonidal cysts treated and cured by the injection

of a modified Carnoy's solution. This solution consists of absolute alcohol 6 c.c., chloroform 3 c.c., glacial acetic acid 1 c.c., ferric chloride 1 gram. This solution has the qualities of moderate penetration with rapid fixation of the lining cells and excellent hemostasis. Furthermore, therapy may be carried on with the patient ambulatory and radical surgical operation avoided.

The patient I wish to present tonight is a white man, aged twenty-seven, by occupation a bookkeeper. With



Fig. 1. Antero-posterior view showing extent of congenital sinus of the neck injected with Beck's paste. The sinus was obliterated successfully by injection of sclerosing fluid.

the exception of quinsy, more especially on the left side, in 1922, and tonsillectomy performed at a later date, his history of previous illnesses is entirely negative. His complaint consisted of a discharge from a small opening in the skin of the lower portion in the left side of his neck. This has persisted as far back as he can remember. Sometimes the discharge would cease for two or three days, during which time the throat became irritable, a cough developed, all being relieved by a reappearance of the discharge through the external opening. Complete physical examination was entirely negative. The patient appeared at my office first on July 25 and was referred to me for treatment for his cervical fistula. I decided to use the sclerosing fluid as previously mentioned. I first injected methylene blue to determine if the fistula was a complete one and to locate the internal opening. With the assistance of an injection of methylene blue I was able to see the internal opening located in the left pharyngeal wall near the base of the tongue. I then injected lipiodol and took an x-ray film at the same time. This was not entirely satisfactory.

The following day I injected a bismuth emulsion and repeated the x-ray study which showed the tract more clearly throughout its entire extent. A day or two later I injected this sinus with the sclerosing fluid, using an ordinary 2 c.c. hypodermic syringe, but first covering the site for injection and the area about the external opening with vaseline to preyent irritation or burns of the skin. While the patient's mouth was open I held a pad of cotton over the area of the internal opening and then waited a minute for the solution to penetrate, to some extent at least, the lining of the sinus. The only reaction the patient suffered was an irritated raw feeling of his throat which he stated reminded him of the time he had his tonsils removed.

Although over two months have elapsed since this treament, the sinus has remained closed for the first time in twenty-seven years.

DISCUSSION

Dr. J. F. Corbett: I think this paper is very much worth while. It is something that as far as I know has not been done as often as the procedure apparently merits.

While not a branchial cyst, there is a case which comes to my mind and which, if you will bear with me, I will report. This patient had been shot in the face and there was a fistula of the parotid gland, the normal duct being practically closed. A very fine probe could be passed into the distal portion of the duct but it accomplished nothing definite in reëstablishing the continuity and finally Dr. Sedgely at the Veterans' Bureau injected some absolute alcohol. He did that with a good deal of pressure, so much so that he could feel the parotid gland swelling at the time. This was followed by a terrific reaction, a great deal of pain and discomfort, which finally subsided and in the course of time I examined the patient to see whether or not there was any secretion from the ampulla. This could not be found.

I asked the patient if that side of his mouth was dry and he said it was. Apparently the alcohol injection had destroyed the parotid gland. He was given just one injection under quite a bit of pressure but it seems that if it would destroy the epithelial lining of the parotid it would sclerose the smooth wall of a cyst. I congratulate Dr. Robitshek in his reported case. I would like to ask him how much swelling and discomfort there was following this injection?

Dr. Gilbert Cottam: I have had a recent opportunity to use this solution in a young man with a pilonidal sinus which persisted after four attempts at operative relief by dissection had been made during the last six years. I found an area of scar tissue about two inches wide by four inches long over the lower lumbar vertebræ, at the lower end of which was a fistulous opening discharging sanious fluid. About one and a half inches below this opening was another one, between the folds of the nates, which apparently was not discharging any fluid. Communication between these two openings was, however, demonstrated by injection of lipiodol followed by the taking of lateral x-ray pictures which also showed that the sinus was wholly superficial. Two injections of the sclerosing solution were made, five days apart, and at the last examination, made six months ago, the lesion appeared smoothly healed.

It is a simple procedure, free from unpleasant drawbacks, and would seem to have its greatest field of usefulness in these congenital sinuses which are difficult to eradicate by dissection. It can also be used in any type of sinus formation where the fluid can be confined to the sinus itself, but I question the advisability of its employment in such conditions as the bronchial fistulæ which sometimes remain after thoracotomy, for in such cases there would be no way of preventing the fluid from reaching the interior of the lung.

Dr. O. W. Yoerg: I would like to ask Dr. Robitshek whether or not this could be used with a urachal sinus. At times these lesions have a rather large sac.

Dr. E. C. Robitshek: The authors of the original article do not mention this mode of treatment for such purposes, and I have had no experience with such cases.

Dr. Corbett asked about swelling—there was no swelling present following this treatment in my patient. However, he stated that he felt a sharp cutting pain

following the treatment which reminded him of a similar pain following the removal of his tonsils.

DIAPHRAGMATIC HERNIA

CASE PRESENTATION

O. W. Yoerg, M.D.

The case is that of an elderly woman, seventy-three years of age, the mother of twelve children, with a negative history except for pneumonia when forty years old and a history of injured ribs and shoulder at different times. Whether or not there had been actual fractures I was not able to ascertain.

She gave a history of having been perfectly well, as far as her abdomen was concerned, until about two months ago, while turning over in bed, she experienced severe pain in the lower part of the left chest. After getting up and walking around, the pain gradually disappeared. She has had a number of attacks since then and has noticed that heavy meals cause her distress.



Fig. 1. X-ray taken with the patient in erect position showing upper portion of stomach above diaphragm. The esophagus is curled and pushed upward to the left.



Fig. 2. X-ray taken with the patient in a recumbent position. The outline of the barium is visible and the esophagus is apparently pushed to the right.

The examination of the abdomen did not show anything definite except apparently some tenderness in the upper abdomen. There was no history of an ulcer or gall-bladder attack. The patient stated that the pains penetrated to her back over both shoulder blades and occasionally to the top of her shoulders. Dr. Allison made a gastrointestinal study and found a hernia at the esophageal hiatus. A part of the stomach has herniated into the chest cavity on the left side. Dr. Hanson, Dr. Allison's associate, stated that the opening is one of the largest they had ever seen. The esophagus is apparently pushed up and curled.

Dr. Hanson said that when he made a fluoroscopic examination in the erect position the stomach had entirely dropped out of the hernial sac of the chest and lay in its normal position in the abdomen.

About ten days or two weeks ago the patient had abdominal distress and has been in the hospital for two days. She is definitely jaundiced. A flat plate of her gallbladder is negative. The question is, does she also have gallbladder and liver disturbance? An abdominal binder was applied which has given her some relief. She likes to wear it in bed, as ordinarily, in turning, she experiences considerable pain due, undoubtedly, to a pull on the stomach attachments.

Dr. Bulkley called my attention to a recent article in *The Journal of the American Medical Association* (Vol. 101, No. 13, Sept. 23, 1933) on Diaphragmatic Hernia. It appears that prior to 1925 the condition was only occasionally recognized and according to the Rochester statistics, I believe, only thirty cases were recognized prior to 1925 and 147 cases from that time until 1933. It appears that most of the x-rays had been taken with patients in the erect position with the stomach out of the hernial sac. Now all pictures are taken with the patients lying down and the condition is easily recognizable.

Harrington states that he examined the esophageal region in several hundred abdominal operations and has found many cases where he has been able to put from one to three fingers along the esophagus into an apparently small hernial sac.

DISCUSSION

Dr. E. C. Robitshek: Diaphragmatic hernias occasionally follow severe crushing types of injuries. This fact should be kept in mind when examination of such injured patients are undertaken. The symptoms of diaphragmatic hernia are frequently indefinite, but most commonly resemble those of diseases of the gallbladder or gastrointestinal tract.

Dr. O. W. Yoerg: I did not go into the etiology of this condition, thinking that probably you would get more out of Dr. Harrington's article.

Apparently all para-esophageal hernias are congenital in origin although we do have traumatic hernias. Hernias due to trauma are not really true hernias and can be through the dome or various parts of the diaphragm. The congenital type all have sacs, and apparently the sac is most frequently attached to the stomach.

In operating, the ligament of the liver is cut in order to pull the liver down for better exposure. It is often a difficult procedure. The condition becomes operable only if the patient suffers distress.

Dr. J. F. Corbett: The chest approach will simplify it.

Dr. O. W. Yoerg: The chest approach is often used

although the abdominal route is preferred by most surgeons.

Dr. E. C. Robitshek: Might we have strangulation in cases of this type?

Dr. O. W. Yoerg: I believe not in this type, perhaps in the traumatic type.

MALIGNANT TUMORS OF THE LARGE INTESTINE

PATHOLOGIC ASPECTS OF 210 CASES COMING TO NECROPSY

Lawrence M. Larson, M.D., Ph.D.
Assistant in Surgery, University of Minnesota
Minneapolis

The findings upon which this report is based are taken from a series of 210 cases of malignant growths of the colon which came to necropsy in the Department of Pathology of the University of Minnesota up to July 1, 1933. This disease is not infrequent as judged from many statistical reports, its incidence being almost equal to that of cancer of the stomach. Up to July 1, 1933, of 21,648 autopsies done by the Department of Pathology, 723 deaths resulted from malignancy of the intestinal tract proper. This study excluded carcinoid tumors of the appendix, and neoplasms of the gallbladder and pancreas. The distribution of these 723 cases is as follows: oral cavity, 42; esophagus, 57; stomach, 399; small bowel, 11; large bowel and anus, 214. The highest age incidence occurred in the fifth and sixth decades; the youngest patient was fourteen years and the oldest eighty-four; there was no marked preponderance of cases in either sex.

The anatomic distribution of these 210 cases was as follows: Cecum, 26; ascending colon, 5; hepatic flexure, 10; transverse colon, 8; splenic flexure, 7; descending colon, 11; sigmoid, 36; rectosigmoid, 33; rectum, 73; anus, 1. It is thus seen that these growths were located with the greatest frequency at the two extremities of the colon and again emphasizes the fact that regions of stasis in the bowel are of especial predisposition in the etiology of neoplasms. An encouraging fact is that more than one half of these tumors of the colon were located in the rectum, rectosigmoid or lower sigmoid, and theoretically at least these could be visualized by direct inspection through the sigmoidoscope or proctoscope.

In about one half of the cases coming to necropsy the malignant lesion was mechanically resectable by surgical methods, since no extension or metastasis was found at autopsy. About a third of the cases presented metastases in the liver or regional glands. At the flexures of the colon, the hepatic, splenic and the rectosigmoid, where considerable narrowing of the lumen takes place, metastases to distant organs were much less frequent than at other areas. This is due to the fact that in these situations the neoplasm very soon causes obstruction and relief is sought or death occurs at a relatively earlier date than with lesions in other locations. In other regions, namely the cecum, ascending, transverse, and descending colon, the sigmoid and the rectum, there were no differences as to the incidence and location of their metastases. Practically every organ in the body was involved in metastases in this series of cases.

The seriousness of obstruction anywhere in the large intestine is well known because of its distressing symptoms, its frequently disastrous termination, and the type of lesion which it usually denotes. In this series, 81 per cent showed obstruction which in many instances was complete, and in practically all cases contributed to the fatal outcome. Spontaneous perforation of the growth occurred in 30 per cent of the cases. This is a relatively few number when one considers the fact that high degrees of obstruction accompanied this ulceration, and again emphasizes the tendency of these lesions to slow growth. The ever present chronic inflammatory reaction with its consequent fibrosis and scar formation renders these areas able to withstand high degrees of intraintestinal pressure. Conversely, the more rapidly a tumor grows, the more likely it is to perforate, and when it does there is widespread extension of the malignancy if the individual does not succumb to the immediate effects of the perforation.

The immediate cause of death in these cases was most frequently peritonitis; secondly, exhaustion from the deleterious toxic effect of the tumor and its metastasis; and, lastly, associated diseases such as cardiorenal-vascular, pulmonary, cholecystitic, appendicitis or primary malignancy located elsewhere in the body.

Polyposis was present in localized areas in twelve cases and was diffuse throughout the colon from the cecum to the anus in four instances. The relationship of these polyps to carcinoma has been proved and there seems to be convincing evidence that if the patient harboring these tumors lives long enough, malignant metamorphosis will eventually take place.

DISCUSSION

Dr. J. F. Corbett: I was rather surprised in the figures, if I understood them correctly, of the common incidence of metastases in all locations of growths of the large bowel. There is a common impression that tumors on the left portion of the bowel, the sigmoid and the descending colon, are more apt to be followed by metastases than in the tumors of the cecum. Perhaps the reason the anatomical results differ from the surgical results is this: Usually in the right half of the abdomen we have a clean-cut blood supply and it is possible to do a very complete and radical operation. Tumors on the other side, particularly those lesions located at the junction of the sigmoid and descending colon, bring up the question of a very complicated blood supply and an adequate circulation must be maintained at any cost. The removal of a considerable portion of the mesentery is apt to destroy the blood supply to the distal portion of the bowel and I think most surgeons are apprehensive of this and perhaps cut the corners a little more closely than they do when they are dealing with a distinct blood supply, as we have on the right half of the body.

It seems to me that most of the patients I have seen have come, perhaps, not because of the absolute obstruction but of impending obstruction. Symptoms of difficulty in evacuating the bowels, pain referred to the colon, bring patients to the doctor and I must confess that it was largely through the medium of the x-ray that I have been able to make a diagnosis in a majority of these cases. I think that this applies particularly to carcinomata of the left half of the colon as they are not readily felt and are really recognized because of the obstructive tendency.

I recall a case a short time ago where there was extremely early metastases in a case of carcinoma of the right colon. The tumor was in the ascending colon, had not produced any obstructive symptoms. The patient was anemic, and fortunately in this case I had an x-ray taken before attempting any surgical removal and found very large metastases in the lungs. The tumor had not obstructed. It was a question whether the lung metastases would destroy the patient before any emergency surgery became necessary. It did destroy the patient before obstruction occurred.

This subject is so great that I hardly know where to begin on such short notice, and where to end the discussion. I want to thank Dr. Larson for his painstaking efforts in reviewing the statistics and I think he has given much encouragement to the surgeon in early operation and even in operation where the symptoms of obstruction have developed.

Dr. C. O. Rice: I would like to have Dr. Larson discuss the treatment in relation to the grading of carcinoma. Is a carcinoma of the rectum, Grade 4, routinely left out of operation, and preferably given radium or x-ray? Also, regarding metastasis, does a Grade 4 carcinoma metastasize more quickly than a Grade 1 or 2?

Dr. Ivar Sivertsen: I would like to ask Dr. Larson relative to the incidence of types of carcinoma in the so-called different areas in the bowel. There must be a difference as regards metastases, if we distinguish between the different types of growths. The *cauliflower* type of growth was formerly thought to be the most malignant. We now know it to be the least malignant. The *ring*, or *annular* form, is between the so-called least malignant and the most highly malignant, or the *colloid* type. Is there any difference as to incidence of these types in the different parts of the bowel?

The question of symptoms of cancer of the bowel is very important. Only last week I saw a case of cancer of the bowel where the patient complained of very indefinite abdominal pain, the chief symptom being that of diarrhea. There was no obstruction and no blood present in his stool. At operation we found a very large growth at the splenic flexure which had not been palpable previous to operation. This man laid all his symptoms to the fact that he had been drinking beer and believed his diarrhea was due to this. In this case there never had been constipation but he did have a definite soreness of the abdomen, plus a diarrhea. Any change in the bowel habits of an individual should demand a very careful and thorough examination of the colon.

Dr. Stanley R. Maxeiner: I regret very much that I did not arrive in time to hear all of Dr. Larson's paper. I think that this is a particularly timely subject and that the Doctor should be congratulated upon the excellence of his presentation.

It seems to me that one of the patient's symptoms which is deserving of particular note is a change from his normal stool habit. Someone mentioned the difference in the general appearance of the patient in right sided and left sided colon involvement. During the past few years, I believe we have had about thirty-six cases of carcinomas of the colon and rectosigmoid, and we have noted to a striking degree the presence of anemia and toxicity which accompanied the right tumors as compared with those situated on the left side.

With reference to technic of operation we have personally preferred to operated upon malignancies of the colon in more than one stage and in the presence of obstruction and distension our primary object has been to relieve the obstruction and later to remove the growth. Crile's efforts, I believe, have done more to establish the lowered mortality of stage operations than those of anyone else. Years ago I had the pleasure of watching Alexis Thompson of Scotland perform one of his superb operations for carcinoma of the rectosigmoid, and it will be borne in mind that he was one of the early advocates of radical surgery with the sacrifice of the sphincter. Thompson showed conclusively in his early statistics that his end-results were radically improved by this method.

We have a goodly number of patients with colostomies, some being women who have attended parties and played afternoon bridge without any one of their friends knowing that they had such a condition. A controlled colostomy with proper care is not the horrible thing that it formerly was and should never delay the patient or the surgeon in performing a prompt radical operation. We have one woman upon whom we operated by the Coffey technic following a colostomy for almost total obstruction of the rectosigmoid. Microscopic examination showed the pathology to be entirely inflammatory, superimposed upon a chronic diverticulitis. Restoration of the normal canal in this patient would have been an operative impossibility because of the location of the obstruction. The patient never had the last inch and a half of the rectum removed.

I have been very much impressed with the favorable results and the low mortality in our colon surgery, particularly the region of the rectosigmoid. We have several patients whom we operated upon and found what we considered practically hopeless and helpless conditions, but on whom we performed the radical operation and whom we find living and quite well five to seven years following their operations. In other words, it would seem that one is justified in taking somewhat desperate chances in a condition that carries virtually a one hundred per cent mortality. In one or two instances, we have had more difficulty in overcoming the objections of the patient's family physician than the patient's.

Dr. Lawrence Larson: The question concerning the gross appearance of the lesion in relation to its degree of malignancy is a rather difficult one. At the present time, as far as I know, there is not much evidence that the two are related except in the case of the colloid type, which is usually considered more malignant. Upon the microscopic picture alone can one differentiate relative degrees of malignancy.

The younger the patient who harbors the malignancy, the more likely the lesion is to be of a high degree of malignancy. The older the patient, the greater the chances are of the tumor being slow growing and the less the tendency to metastasis.

As to the symptoms of lesions of the right as contrasted to those of the left half of the colon, they are altogether different. On the right half, the contents of the colon are fluid, and the growths which occur here are most likely to be flat and ulcerating. They are not the annular napkin-ring type such as those of the left colon. On the left side the content of the colon is semisolid and solid, and, along with the constricting type of growth which is most common here, obstruction takes place early and may be the predominant symptom.

Authors have frequently divided the symptoms of carcinoma of the left side of the colon into three stages:

1. The chronic dyspeptic type of complaint, soon followed by
2. The chronic intermittent obstruction, and finally
3. The acute obstruction superimposed on the chronic.

The latter is disastrous and frequently terminates fatally.

Diarrhea as a symptom is usually due to an impaction of feces proximal to the growth, and when this is relieved intermittently, looseness of stools results. Previous to the diarrhea there is apt to be constipation. If the colon could be completely emptied the patient would be rid of the diarrhea.

X-rays are of little or no avail in the diagnosis of any lesion below the lower third of the sigmoid, but since this region is readily accessible to the proctoscope and sigmoidoscope, direct inspection can be readily carried out.

Anemia in lesions of the right colon is a distressing and common symptom and is very likely due to a tendency of this portion of the colon to absorb the toxic products which are elaborated by the growth.

As to the prognosis in relation to the degree of malignancy, it has been found that with adequate treatment, a Grade 4 malignancy has only one-fourth the chance that a Grade 1 has to be permanently cured, other things being equal. The more malignant the tumor, the greater its sensitivity to radium and the better the chance of curing it by that method. It is possible to radiate these tumors preoperatively and then resect the growth a month or two later. In a few instances there have been cases in which there was ab-

solutely no sign of the tumor when the time came for the operation, but of course, the rectum should be resected anyway. Whether or not that form of treatment will work out eventually in a satisfactory manner is difficult to say.

Dr. Stanley R. Maxeiner: I would like to ask if there were any sarcomas in these?

Dr. L. Larson: Not one.

Dr. Stanley R. Maxeiner: In our series we encountered one patient with lymphosarcoma of the rectum who is entirely well two years following a wide local excision. It seems that there are only about 100 cases of sarcoma of the rectum reported in the literature and these have usually died from the disease in due course whether they have been operated upon or not. Our patient had a thorough follow-up treatment with radium and to date has no evidence of recurrence. The sarcomas usually appear as submucous masses, rather rounded in character without ulceration of the mucosa, as compared with carcinoma, which early undergoes ulcerative degeneration.

Dr. L. Larson: I reported four cases of myosarcoma of the rectum with Dr. Rankin not long ago and in these cases death had taken place within two or three years from recurrences, except in one instance in which the patient lived four years, but he had a wide excision and apparently had been cured. The diagnostic feature about myosarcoma is that it arises beneath the mucosa, usually from the muscular tissues, and ulceration is a late phenomena, while obstruction takes place early, because of the broad indurated base which the lesion forms. Metastases are rather late as compared to carcinoma but the tendency to local recurrence is much greater so that radical extirpation is imperative.

F. A. Olson, M.D., *Secretary.*

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of October 11, 1933

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, October 11, 1933. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. C. D. Freeman.

There were fifty members and one guest present.

Minutes of the May meeting were read and approved.

The scientific program was as follows:

Dr. S. E. Sweitzer (Minneapolis) presented the patient and reported the following case of

LOCALIZED MYXEDEMA

Mr. C., aged sixty-two (patient of Dr. R. M. Pederson), developed a goiter in 1916 and was operated by Dr. Gilmore of Bemidji in 1917. A return of the goiter necessitated a second operation in 1926 and this was done at Rochester.

About 1931 the patient noticed swelling of both lower legs. This slowly disappeared but left a localized swelling which still persists. Many nodules and flat hard plaques are to be found on both lower legs. Biopsy showed myxedema. Basal metabolism at present is plus 65. Blood shows hemoglobin 70 per cent, white count 7,600. The eyes show slight exophthalmos. Other findings are normal.

This condition was written up by O'Leary, in 1930, and by Stokes and Pillsbury, in 1931. Recently Ingram reported a similar case. Including his own case, he was able to find only 26 cases reported in the literature. The analyses of Pillsbury and Stokes showed that these cases fall into two groups: (1) those characterized by nodular infiltrations variously distributed to the face, arms, back and scrotum, and (2) those in which are found plaques limited to the pretibial areas and in which the development of manifestations in the skin is associated with exophthalmic goiter.

DISCUSSION

Dr. Arnold Schwyzer (St. Paul): I think this is a very unusual case, in that the man has a plus 65 metabolic rate and a pulse of only 94, and no tremor. It does not look like a very toxic case. I believe it would be a good idea to have that basal metabolic test made over and see if it is really that high. If the rate is plus 65 it certainly is a very rare case. It makes one feel that there must be some other function in the thyroid than just the production of thyroxin, for here there is such a high metabolic rate, and there is also a myxedema which is usually cured very quickly with doses of thyroid. It is strange that he could have so much myxedema left. Is it not possible that there might be some other condition that would make a local change like myxedema, but not directly dependent on the thyroid? I think it worth while to take another basal metabolic test.

Dr. F. R. Wright (Minneapolis): The fact that this man was operated, his thyroid removed, and then developed his myxedema would lead to the suspicion that there may be some other condition, unknown, which causes myxedema.

Dr. Sweitzer: An interesting fact about this patient is that at Rochester they had seven of these cases. Dr. O'Leary wrote an article on the subject. In the cases he described, the patients had as high as plus 50 metabolic rate after operation. In this case we tried Lugol's solution, 4 minims a day, but it pushed the heart rate way up and we had to stop it. I went over the literature quite thoroughly. Stokes and Pillsbury had collected 22 cases from the literature and had three of their own. Some of the cases did well under thyroid and some did not; some were left alone, nothing was done for them, and after a while the myxedema disappeared by itself. They thought possibly there was some interrelation between the thyroid and other glands that produced this myxedematous condition in the skin. So far as I could find out, they do not really know very much about it.

One would think this man should have a low basal, but he has a high basal metabolic rate. Two biopsies have been made and in one of them the section was almost pure slime; there was no bleeding, just a little oozing.

The reason I brought him here tonight is that, when I showed him at a recent meeting of the Minnesota Dermatological Society, a doctor from Superior saw the patient and said he had at that time a patient almost exactly like this man. I wondered if we were not missing some of these patients. This condition might not be so rare as we think. Sometimes when we find a condition we think rare, and report it, we hear of other cases just about like it.

Dr. Bertram S. Adams (Hibbing) read his inaugural thesis entitled Gallbladder Disease. (To appear later in Minnesota Medicine.)

GALLBLADDER DISEASE

DISCUSSION

Dr. Max Hoffman (St. Paul): My thesis before this Academy was also on gallbladder disease. At that time I reported some 155 cases operated upon because of a history of gallbladder symptoms. In this group over 90 per cent showed definite pathological changes. Dr. Adams' group also showed pathology in a large percentage of the cases. He, too, emphasizes the importance of the history in making the diagnosis. Physical findings rank second.

In this connection I would like to mention a physical sign indicating gallbladder pathology that has recently come to my attention. In the presence of gallbladder disease, on inspiration there is definite tenderness below the costal margin on a light tapping with the ends of the fingers. On expiration, this tenderness disappears. Peptic ulcer cases do not present this sign. It differs from the usual method of examining for gallbladder trouble inasmuch as the percussion is light and the tenderness is elicited only during inspiration.

Dr. R. T. LaVake (Minneapolis): I would like to hear some discussion as to the present opinion on the relative merits of cholecystectomy and cholecystotomy.

Dr. Arnold Schwyzer (St. Paul): As to drainage of the gallbladder, I may be inclined a bit too much toward one side. In about the last 400 cases I have not drained except perhaps in a very exceptional case. I remember one case where a surgeon did not feel that he should take out the gallbladder, but simply removed three stones that were about the size of the yolk of an egg. He did that in August. The woman later had trouble, and in the next February he brought the patient to me because of continued pain and fistula. When I went in, there were four stones just about the size she had had before. They could not have been overlooked. That shows again the well known fact that large stones can reform inside of six or seven months after simple emptying and draining of the gallbladder.

Conditions where I feel that drainage may be advisable do occur rarely; for instance, in a very bad condition of the heart, let us say in the presence of a gangrenous gallbladder; and still I must admit that in recent years I have taken out every one of these too. And they seem to have done better than I dared hope for. One such patient, however, had an embolism. Would it have been avoided by simple drainage? It is very questionable. There was a severe coli infection.

About a week or ten days ago I looked up my cases of embolism in a book in which I list my operations. There are the last 3,200 cases in that book, and in that group there were three embolism cases followed by death. The one bugbear we have in gallbladder operation is that the patient may have an embolus afterwards; but, even in the very acute cases, I feel like taking the gallbladder out. In these cases it is good if we can get along with a small incision. Of late I have made a new kind of incision. First an ordinary longitudinal incision is made; then, after dividing the outer rectus sheath, I pull the rectus out and split the transverse fascia horizontally. In that way, in closing the wound, the rectus muscle falls over the transverse sutures. I have done that in twenty-two cases. We were able to let the patients get up sooner, some getting up the day after operation, and the average being four days.

John Chaplin Barton, M.B., winner of the prize for the best piece of original investigation by an undergraduate of the University Medical School, read his essay on The Distribution of Intranuclear Inclusion Bodies Primarily Involving Vascular Endothelium, and was awarded the annual prize of $100.

THE DISTRIBUTION OF INTRANUCLEAR INCLUSION BODIES PRIMARILY INVOLVING VASCULAR ENDOTHELIUM

ABSTRACT

I am condensing my paper in order to cover in the shortest possible time the most essential features of it.

First, I should like to say something about the present concept of virus diseases. It is a well-established fact now that in virus diseases the virus grows intracellularly and produces changes in the cell recognizable as inclusion bodies. These inclusion bodies may be either cytoplasmic or intranuclear. Recent information indicates that cytoplasmic inclusion bodies, while they contain the virus, represent largely cellular material, inasmuch as incineration shows the inorganic material to be concentrated. Intranuclear inclusions do not show this inorganic concentration. Both types of inclusion bodies are quite resistant to trypsin digestion, showing at least a certain proportion of living substance to be present. Furthermore, the infective nature of the virus is not destroyed by this digestion.

We are primarily concerned here with intranuclear inclusion bodies; and these, like other inclusions, are acidophilic and are recognized in section by their staining red with eosin-hematoxylin or Giemsa stains, whereas nuclear material generally stains blue.

Now, something about the particular disease used for his study—fox encephalitis. Fox encephalitis was first described by R. G. Green, in 1926, and has been extensively studied since. This disease occurs on many fur farms in endemic and epidemic form and is undoubtedly imported from the wild. The incubation period is from four to five days. The onset is sudden, the animals sleep much and convulsions and paralysis are commonly found. The course is acute or chronic and the disease may terminate within twenty-four hours or may remain with the animal for months. The microscopic pathology reveals the same findings found in cases of human encephalitis: petechiæ, lymphocytic infiltration about the vessels, lymphocytic nests, etc., are present in the brain. The infective agent of the disease has been shown to be filtrable.

As previously stated, the inclusion bodies found here were all intranuclear and were discovered only after long investigation, probably because of their peculiar distribution not associated with nerve cells. It was in the endothelial cells of the blood vessels of the brain that they were first demonstrated. One might mention here that this was the first time and the only disease in which inclusions bodies have been found in endothelial cells. Subsequently, inclusions were found in ependymal cells, pia-arachnoid cells, kidney, adrenal and liver. It was in order to determine the general distribution in these organs that this quantitative study was undertaken.

I will mention briefly the general technic of investigation. Two groups of ten animals each were considered; one of experimentally infected foxes and the other of foxes which had acquired the disease naturally. All those selected for the experimental group were injected with virus by puncture into the cisterna magna. Then in every instance, before the sections of these animals were used for study, the microscopic pathology was previously determined as characteristic of encephalitis. Sections of the brain, liver, adrenal and kidney were used. The sections from the brain were selected from the various topographical portions, *i.e.*, frontal, temporal, basal, ganglion, etc. Sections were cut at 8 microns and stained with eosin and hematoxylin. Each section was completely surveyed under oil immersion lens and only definite inclusion bodies were counted and recorded. Then, using a lens and mirror system, magnified images of the various sections were projected and measured by means of a filar-wheel micrometer.

From the area thus gained, from its known depth of 8 microns, and from the standard magnification used, the actual volume in cubic millimeters could readily be calculated. It was then easy to find the number of inclusions per cubic millimeter in each section.

It will only be necessary to mention those results of this investigation that would be most important and mean the most to this group. Approximately 5,000 inclusions were found in each group—natural and experimental. About 75 per cent of these 10,000 inclusions were located in vascular endothelium. This would seem to indicate a certain selectivity in virus diseases for this cell type. In addition to finding inclusion bodies in the endothelial cells of the body, they were at this time discovered to be present in the cells of the pia-arachnoid and hepatic cord cells. As one might expect, the inclusions were more generally distributed throughout the various cell types of the body in the experimental group than in the natural group. That is, the liver, pia-arachnoid and ependymal cells contained more inclusion bodies than the same structures in the natural group. On the other hand, in the natural the inclusions were largely concentrated in the endothelial cells—about 90 per cent appearing there. The pia-arachnoid cells in the experimental group showed a much higher incidence of inclusion body formation than the same cells of the natural group. This, no doubt, is due to their proximity to the point of injection of the virus.

Inclusion bodies were found in the ependymal cells only in the experimental group and here again the direct introduction of the virus into the spinal fluid is undoubtedly the cause. The hepatic cord cells were only slightly affected in both groups and the inclusions found in the kidney were also few and entirely confined to the endothelium of the glomerular capillary loops. In the brain, the topographical parts most affected were the basal ganglion and surrounding areas. All told, about 90 per cent of all the inclusion bodies counted were centered in and about the central nervous system. This bears out very well the general pathology of encephalitis.

It is hoped that this new distribution of inclusion bodies may offer new possibilities in the investigation of human encephalitis.

DISCUSSION

Dr. Moses Barron (Minneapolis): I would like to ask whether any studies have been made in other diseases of the human similar to the present study, to ascertain what inclusion bodies are present in the cells. He states that the virus was a filtrable virus. Did he study the material to establish that it is a filtrable virus by using the filtrate only from Berkefeld filters, or did he use the macerated tissue?

Dr. Barton: As far as the study of inclusion bodies in the human is concerned, I don't believe there has been a great deal of work done in that line. We have looked over some sections from human encephalitis for inclusion bodies but have not been able to find them. Whether this was due to difference in staining, we do not know. Some one in St. Louis has studied sections taken from humans dead of encephalitis during the recent epidemic there—and claims to have found inclusion bodies in the kidney—but her work is not available for study.

In regard to the filtrate, we took foxes dying on fur ranches, autopsied them, and removed the brain sterilely—saving a piece of it for microscopic study. Under the microscope these sections were diagnosed as encephalitis. Then the sterile brains were macerated in salt solution by use of a homogenizer, centrifuged and supernatant fluid put through a Berkefeld filter. We then injected the filtrate into the cisterna magna of other foxes and reproduced the disease.

Dr. Barron: Have you studied infantile paralysis in the human for these inclusion bodies? It should not be difficult to obtain material for such a study.

Dr. Barton: Some work has been done on that, but no inclusions have been found.

Dr. John Brown (St. Paul): You said, as I recall, that the brain contained a large number of these inclusion bodies. Does that mean they have a selective action for brain cells, or were they found in connective tissue or neuroglia tissue?

Dr. Barton: I referred to the endothelial, pia-arachnoid and ependymal cells in the brain—taking these as a group. We found no nerve cells affected nor any other type of brain cell except the three types mentioned.

R. T. LaVake, M.D., *Secretary.*

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

A New Approach to Dietetic Therapy. Eugene Foldes, M.D., Formerly Assistant Professor of Medicine, University of Budapest, Hungary. 434 pages. Illus. Boston: Gorham Press, 1933.

Rockefeller Foundation Annual Report, 1932. 455 pages. Illus. New York: Rockefeller Foundation, 1933.

The 1933 Year Book of General Medicine. 831 pages. Illus. Price, cloth, $3.00. Chicago: Year Book Publishers, 1933.

DIETETICS FOR THE CLINICIAN. Milton Arlanden Bridges, B.S., M.D., F.A.C.P., Associate in Medicine at the New York Post-Graduate Medical School, Columbia University, New York, in collaboration with Ruth Lothrop Gallup, Dietitian. Foreword by Herman O. Mosenthal, A.B., M.D., Director of Medicine at the New York Post-Graduate Medical School, Columbia University, New York. Philadelphia: Lea & Febiger, 1933. Price $6.50 net.

It is intimated in the preface that this book is aimed to meet the needs of the general practitioner and of the hospital interne, without attempting to be expansive, to go into great detail or to be profoundly scientific. The author may be assured that there are few members of the classes for which he writes who will find it necessary to go outside this book for help in feeding the sick or the well. Rather the complaint will be that there is too much, not too little, in these six hundred odd pages.

After a description of the mechanics, physiology, and chemistry of digestion, come the all-important vitamins, to which no undue preponderance is given, a commendable moderation in the face of the manner in which these hidden food principles are thrust forward today. Rather cautiously it is admitted that it may be advisable to make to a generous mixed diet supplementary additions of vitamins B and D.

In the classification of foods there are extensive tables showing the distribution of the various food principles—carbohydrates, proteins, fats, and mineral salts. In passing, it is interesting to note how far down is spinach in the percentage list of vegetables containing iron. The child in the "funnies" who so vigorously condemns the despised vegetable has ground for the refusal, if not for the profanity.

Ruth Lothrop Gallup, dietitian, contributes a most excellent section on food from the culinary standpoint. Too often may be said of food what Dr.

Johnson said to Boswell of the roast beef that was put before them—"it was ill-fed, ill-dressed, ill-cooked, and ill-served." Inadequate cooking for the well is bad enough, but it is unpardonable to bring to the sick, food that is badly chosen, badly cooked, and most unappetizing in its appearance. On trays in private houses, as well as in hospitals, the doctor sees plates swimming in half congealed gravy, with the hot things no longer hot and the cold things lukewarm. This section gives many valuable pointers such as how to prepare and cook vegetables, not forgetting the salt in the water, how to pick out a tender chicken, how to cook bacon in the oven instead of in the frying pan, how to select good meats and how to cook them. It makes one hungry to read her description of foods and their preparation.

More than three-quarters of the book is taken up with the consideration of the special diets for particular diseases, beginning with acidosis and ending with uric acid diathesis. The concluding part is on the feeding of infants and older children. In some of the diseases and conditions that are taken up, diet does not seem to be of first importance, but there can be no question of the prominent place food should be given in Bright's disease, constipation, diarrhea, diabetes, obesity, tuberculosis, typhoid fever, and gastric ulcer. It is to be noted that the author is not averse to using proteins in Bright's disease and that he favors a high caloric diet in typhoid. Probably many typhoid patients are starved today, and those with nephritis get too little meat, eggs, and fish. The combined diets of Gerson, Sauerbruch, and Herrmansdorfer receive marked attention and seem to be acclaimed enthusiastically, although there is a lack of clearness in the text that makes it difficult at times to tell whether some of the claims are made by the above mentioned authors or by Dr. Samuel Ayers, who writes this part.

A few rather striking statements deserve special mention. "There is no doubt that the supplementing of vitamin concentrates to the breast-fed child, without evidence that they are necessary, has been overdone. . . . . It is a common belief among parents that whatever the diet of the child, vitamins should be given irrespective of whether the diet is adequate therein or not. The possible ill-effect of hypovitaminosis is far less than hypervitaminosis." . . . "A cereal diet renders the skin more irritable and a vegetable diet confers a certain degree of immunity against irritants." In Bright's disease "a diet should be aimed at which maintains the patient at a normal weight, that is, does not contain an excess of carbohydrates or fat, contains sufficient protein to maintain the hemoglobin and the red cells at a normal level but not above it, and allows the usual amount of salt and fluids customary in the average diet."

Several foods of a more or less proprietary nature get particular notice, especially Mead's cereal, his dextri-maltose and his lactic acid milk. Klim also is included in many formulas and so is Borden's malted milk. The boom of bananas as a food for children is joined in by this book.

An uncritical examination of Bridges' work finds little to criticize from a literary standpoint. There are some passages that are not very clear, notably a paragraph on page 33 about amines and ptomaines. Some carelessness is evident on page 53 where the statement is made, "Foods as a whole enjoy a two genus classification: those that are nutritive and non-nutritive." While the meaning can be discovered, only one class is mentioned. On the same page: "The classification of nutritive foods is subdivided into: carbohydrates, fats, proteins and mineral salts." Farther on: "Mineral salts and organic acids, although of no caloric or nutritive value, are especially necessary to proper body metabolism." But these slight faults do not prevent this from being a well worth while book.

W. Davis, M.D.

POSSIBILITIES AND NEED FOR DEVELOPMENT OF LEGAL MEDICINE IN THE UNITED STATES. O. T. Schulz (National Research Council Bulletin, October, 1932, No. 87), Washington, D. C., National Research Council, 1932.

Institutes of legal medicine, affiliated with the University system, are an integral part of the ministry of justice in continental Europe. Medical science is impartially applied to the needs of law and justice and for the Court rather than for either party to a legal action.

In the United States the present state of expert medical testimony is unsatisfactory both to medicine and law. It would be difficult to incorporate the continental medicolegal plan into our own government. However, scientific knowledge may be organized and made useful in the administration of justice. This bulletin recommends that in Minnesota a medicolegal service, available to the agencies of justice, be developed within the University by coördination of existing scientific activities and their expansion where necessary.

Royal C. Gray, M.D.

FETAL, NEWBORN AND MATERNAL MORBIDITY AND MORTALITY. A publication of the White House Conference. 486 pages. Illus. $3.00. New York: D. Appleton-Century Co., 1933.

Compiled by a large group of the best known obstetricians of America, this volume deals frankly with a subject to which we can hardly point with pride. Recognizing the tremendous numbers of abortions, premature births, and stillborn which occur, with very little decrease in recent decades, as well as the failure to produce satisfactory reduction in maternal mortality in this country, this report indicates in readable, concise manner, the measures we must adopt to effect improvement. Referring to the constant increase in hospitalization of parturient women, the authors sound this warning note: "This has many decided advantages, but also such disadvantages as exposure to cross infection, and the often false security of the operating room. The latter factor undeniably has led to much unnecessary operating with its resulting trauma and increased morbidity and mortality. The operative rate for confinements amounts to 15 per cent in Scandinavian countries and England; between 65 and 80 per cent in this country, according to 20 answered questionnaires."

Contrary to accepted opinion, the statement is made that tuberculosis in pregnant women, when cases are properly handled, is likely to improve during pregnancy and for a considerable time thereafter.

Excellent statistical studies of the various facts associated with the subjects discussed, help to make this volume an excellent reference book. It deserves a place in the library of anyone interested in obstetrics.

Thomas Myers, M.D.

INDEX TO VOLUME XVI

A

Abnormalities, Congenital, of the genito-urinary tract and their surgical treatment, 260
Abscess of the mediastinum, 257
Abscess, Subdiaphragmatic, and liver abscess, 11
Achlorhydric anemias, The, 617
Acute mononucleosis or glandular fever, 305
Acute vasospastic hypertensive disease with transition into malignant hypertension: final report of a case with necropsy, 186
Adequate therapy of syphilis, 557
Adequate treatment of syphilis (discussion), 453
Adson, Alfred W.: Surgical consideration of cerebral lesions, 221
Affective disorders, Treatment of, 81
Agranulocytosis, 299
Allergy in the field of ophthalmology and oto-laryngology, 390
Allergy, Some practical aspects of, 32
Alvarez, Walter C.: The appeal of quackery to the nervous invalid, 86
Ambulant treatment of hernia, 446
Amebic dysentery, Management of, 748
Amidopyrine in diabetes insipidus (case report), 635
Amputations for diabetic gangrene, 448
Amytal with ephedrine, The combination of, in the treatment of asthma, 44
Anal fistulas, 19
Anal pathology, common, and focal infection, The etiology of, 247
Anderson, Carl M.: Conservative treatment of otitis media, 610
Anderson, James Kerr: The etiology of common anal pathology and focal infection, 247
Anemia, Chronic, with splenomegaly and granulocytopenia (case report), 207
Anemias, The achlorhydric, 617
Anesthesia, 216
Anesthesia, General, local, spinal and balanced, 572
Anesthesia, Remarks on certain special methods of, 402
Aniridia (case report), 705
Appendicitis in the tuberculous, 742
Aorta, Coarctation of the (case report), 704
Aorta, Hypoplasia of the, as a possible cause of cardiac failure, 172
Appeal of quackery to the nervous invalid, The, 86
Arthritis, chronic, Modern conception of, 719
Arthritis, Coexistent chronic infectious (atrophic), and cholecystitis: results of cholecystectomy, 522
Asthma, The combination of amytal with ephedrine in the treatment of, 44
Atelectasis, pulmonary, postoperative, Prophylaxis of, 105
Avitaminosis, Eye manifestations of, 675
Avitaminosis, The skin manifestations of, 670
Avitaminosis, Systemic manifestations of, 679
Avocation for the male cardiac invalid, An, 345
Avulsion of flexor profundis digitorum (case report), 434

B

Bannick, Edwin G., Koenigsberger, Charles, and Beaver, Donald C.: Acute vasospastic hypertensive disease with transition into malignant hypertension: final report of a case with necropsy, 186
Bargen, J. Arnold, and Larson, Lawrence M.: The mode of spread of carcinoma of the rectum, 478
Barron, Moses: Treatment of malnutrition in adults, 681
Bartels, Elmer C.: Calcification of pericardium (case report), 205
Bartels, Elmer C.: Carcinoma of the stomach with bilateral ureteral metastasis (case report), 578
Bartels, Elmer C.: Fatal postoperative pulmonary embolism, 409
Bartels, Elmer C.: Carcinoma of the esophagus, 226
Barton, John Chaplin: The distribution of intranuclear inclusion bodies primarily involving vascular endothelium, 766
Bayard, Harry F.: Proctoscopic diagnosis of chronic ulcerative colitis, 487
Beard, Archie H.: Practical diabetic diets, 194
Beaver, Donald C., Green, Robert G., and Hartman, Howard R.: The occurrence of tularemia in Minnesota in 1921: Report of two cases—one fatal, with necropsy report, 559
Beaver, Donald C., Koenigsberger, Charles, and Bannick, Edwin G.: Acute vasospastic hypertensive disease with transition into malignant hypertension: final report of a case with necropsy, 186
Beecham, Clayton, and Randall, O. Samuel: The clinical aspects of benign tumors of the stomach, 449
Benjamin, Walter G.: Subdiaphragmatic abscess and liver abscess, 11
Bergh, George S.: Prophylaxis of postoperative pulmonary atelectasis, 105
Biliary system, Gradual decompression of the, 15
Binger, Melvin W.: The combination of amytal with ephedrine in the treatment of asthma, 44
Bladder, Foreign bodies in the (case report), 707
Bladder neck obstruction, Pathology of, with particular reference to cystoscopic prostatectomy, 420
Bladder neck obstruction, The new surgery of, 240
Boies, Lawrence R.: The diagnosis of laryngeal disease, 101
Borg, Joseph F.: Observations on the deep Q wave in Lead III of the electrocardiogram, 694
Borreson, Baldwin, and Burns, Herbert A.: Correlation between clinical and x-ray findings in tuberculous individuals, 119
Branchial fistulæ, The treatment of, with sclerosing fluids, 760
Branton, A. F.: Care of the indigent, 219
Branton, B. J.: Fracture work in the small community, 6
Bratrud, Arthur T.: Ambulant treatment of hernia, 446
Briggs, John Francis: Primary carcinoma of the liver, 230
Briggs, John Francis, and Oerting, Harry: Vasomotor response of normal and hypertensive individuals to thermal stimulus (cold), 481
Brown, Philip W.: Deficiency diarrhea (case report), 534
Brumfield, Helene Paine, and Carey, J. B.: Low basal metabolic rates—a clinical study of states of lowered basal metabolism found in conditions other than myxedema, 396
Buie, Louis A.: Anal fistulas, 19
Bumpus, Hermon C., Jr.: Preparing patients for operation on the prostate gland, 489
Burns, Herbert A., and Borreson, Baldwin: Correlation between clinical and x-ray findings in tuberculous individuals, 119
Burr, George O.: The role of vitamins in nutrition, 668

Book Reviews

Annual reprint of the reports of the Council on Pharmacy and chemistry of the American Medical Association for 1932, 456
Bolyeat, Ray M.: Wheat, egg or milk free diets with recipes and food lists, 714
Beekman, Fenwick: Office surgery, 218
Bridges, Milton Arlanden: Dietetics for the clinician, 767

Doll, E. A.: Mental deficiency due to birth injuries, 72
Dutton, Don C.: Diseases of the coronary arteries, 150
Fishbein, Morris: Frontiers of medicine, 660
Gauss, Harry: Clinical dietetics; a textbook for physicians, students and dietitians, 218
Kaiser, Albert D.: Children's tonsils in or out: a critical study of the end-results of tonsillectomy, 286
Karpman, Ben: Case studies in the psychopathology of crime, 584
Kovacs, Richard: Electrotherapy and elements of light therapy, 285
Lewis, Sir Thomas: Diseases of the heart, 285
Macmichael, William: The gold-headed cane, 504
Matsner, Eric M.: The technic of contraception, 355
New and Non-official Remedies, 1933, 456
Poe, James G.: Modern general anesthesia, 285
Practical medicine series—General medicine, 355
Rothrock, John L.: Ten years of obstetrics and gynecology in private practice, 554
Schulz, O. T.: Possibilities and need for development of legal medicine in the United States, 768
Thorek, Max: Surgical errors and safeguards, 584
White House Conference Publication: Fetal, newborn and maternal morbidity and mortality, 768
White House Conference Publication: Hospitals and child health, 72
Winslow, D. E. A.: Health on the farm and in the village, 356
Wyatt, Bernard Langdon: Chronic arthritis and fibrositis: diagnosis and treatment, 355

C

Calcification of pericardium (case report), 205
Calcium deficiency associated with functional gastrointestinal disturbances in adults, 698
Discussion—Proceedings, Minnesota Academy of Medicine, 503
Campbell, Robert A.: Dacryocystitis in infants, 267
Cancer problems, Present day, 330
Carcinoma of the esophagus, 226
Carcinoma of the rectum and rectosigmoid, Present-day surgical treatment of, 23
Carcinoma of the rectum, The mode of spread of, 478
Carcinoma of the stomach with bilateral ureteral metastasis (case report), 578
Carcinoma, Primary, of the liver, 230
Carcinoma, Primary, of the lungs, 1
Carcinoma, squamous cell, of the lip, The histologic grading of, 473
Cardiac diagnosis, Pitfalls in, 457
Cardiac failure, Hypoplasia of the aorta as a possible cause of, 172
Cardiac invalid, male, An avocation for the, 345
Cardiac neurosis, 78
Care of the indigent, 219
Carey, J. B., and Brumfield, Helene Paine: Low basal metabolic rates—a clinical study of states of lowered basal metabolism found in conditions other than myxedema, 396
Castleton, Kenneth B., and Judd, E. Starr: Some unusually large gallbladders: a clinico-pathologic study, 170
Cerebral lesions, Surgical consideration of, 221
Cervix, uterine, Sarcoma of the, 745
Cesarean section from the standpoint of the general surgeon, 284
Chapin, F. Stuart: The cost of medical care. Why was the survey made? What results were expected from the survey? 147
Cholecystitis, Coexistent chronic infectious (atrophic) arthritis and: results of cholecystectomy, 522
Chronic anemia with splenomegaly and granulocytopenia (case report), 207
Clinical aspects of benign tumors of the stomach, 449
Clinical classification of chronic suppurative diseases of the middle ear, 609
Coarctation of the aorta (case report), 704
Coexistent chronic infectious (atrophic) arthritis and cholecystitis: results of cholecystectomy, 522
Colitis, chronic ulcerative, Proctoscopic diagnosis of, 487
Collins, Arthur N.: Avulsion of flexor profundis digitorum (case report), 434
Colvin, A. R.: Osteomyelitis of the ischium of the ramus, 503
Combination of amytal with ephedrine in the treatment of asthma, The, 44
Committee on Public Health Education, 62, 142, 214, 277, 344, 442, 499, 545, 585, 640, 712, 757
Condit, W. H.: Trichomonas vaginalis vaginitis, 354
Congenital abnormalities of the genito-urinary tract and their surgical treatment, 260
Congenital clefts and scars following burns, 444
Conservative treatment of otitis media, 610
Convulsive states in adults from the neurologic standpoint, 199
Correlation between clinical and x-ray findings in tuberculous individuals, 119
Cost of medical care, The. Why was the survey made? What results were expected from the survey? 147
Cottam, Gilbert: Cesarean section from the standpoint of the general surgeon, 284
Country doctor, Medical views of a, 129
Cowern, Ernest W.: Infectious erythema, 628
Creevy, C. D.: Operative cystoscopy, 448
Creevy, C. D.: Urology in middle Europe, 428
Culligan, John: Gradual decompression of the biliary system, 15
Culligan, John M., and Prendergast, Harold J.: Amidopyrine in diabetes insipidus (case report), 635
Culligan, John M., and Prendergast, Harold J.: Litholapaxy, 426
Cyst, Mesenteric, 532
Cystoscopy, Operative, 448

Correspondence

Farabaugh, C. L., 544
Ikeda, Kano, 755
Schulze, A. G., 544

D

Dacryocystitis in infants, 267
Deaf and hard of hearing, Modern methods for caring for the, 251
Deficiency diarrhea (case report), 534
Diabetes insipidus, Amidopyrine in (case report), 635
Diabetes mellitus, High carbohydrate low calorie diet in the treatment of, 566
Diabetic diets, Practical, 194
Diabetic gangrene, Amputations for, 448
Diagnosis of laryngeal disease, The, 101
Diagnostic significance of pupillary changes, 623
Diaphragmatic hernia, 762
Diarrhea, Deficiency (case report), 534
Distinction of the normal from the diseased heart, 468
Distribution of intranuclear inclusion bodies primarily involving vascular endothelium, The, 766
Diverticulum of the gallbladder (case report), 209
Donohue, Philip F.: Pathology of bladder neck obstruction with particular reference to cystoscopic prostatectomy, 420
Drake, Charles R.: Unsuspected lues revealed by the routine Wassermann test, 43
Duncan, G. R., Mariette, E. S., and Fenger, E. P. K.: The treatment of tuberculosis by hyperpyrexia, 510
Dunn, G. R., and Hamilton, A. S.: Neurofibroma of the ulnar nerve, 283
Duodenal suction, nasal, continuous, Some modifications in the apparatus for, 278
Duodenal ulcer, Gastric and: Results of immunization treatment, 310

Duodenum, Some unusual surgical conditions of the, 451
Dysentery, amebic, Management of, 748

E

Earl, George: Management of open safety pin in the digestive tract (case report), 336
Ear, middle, Clinical classification of chronic suppurative diseases of the, 609
Echinococcus, Reservoirs of, in Minnesota, 744
Eclampsia with ablatio placentæ and blood pressure of only 130 (case report), 578
Electrocardiogram, Observations on the deep Q wave in Lead III of the, 694
Element of fear in the development of functional disorders, The, 84
Ellis, R. V., and Rosendahl, C. O.: A survey of the causes of hay fever for the state of Minnesota, 379
Embolism, Fatal postoperative pulmonary, 409
Emergency treatment of fractures of the upper and lower extremities, 553
Equipment necessary for the first aid treatment of fractures, The, 8
Erickson, Theodore C.: The histologic grading of squamous cell carcinoma of the lip, 473
Erythema, Infectious, 628
Esophagus, Carcinoma of the, 226
Etiology of common anal pathology and focal infection, The, 247
Evisceration, Postoperative, 548
Extremities, Treatment of acute infections of the, 255
Eye manifestations of avitaminosis, 675

Editorial

Abuses in veteran relief, 59
Alcohol regulation, 439
Amebiasis and A Century of Progress, 751
Appendicitis mortality, 638
Beaumont, William, 754
Cancer Committee report, 637
Cancer cures, 637
Cancer survey in Minnesota, 496
Certification of specialists, 212
Chicago exposition, 498
Concerning primary tuberculosis, 751
Discontinuance of progress section, 59
Duluth maligned, 710
Education of the deaf, 639
Equalizing the cost of hospitalization, 58
Federal emergency medical relief, 752
Fever therapy in neurosyphilis, 342
Free medical care, 274
Greetings of the medical profession of the Northwest to Dr. J. W. Bell of Minneapolis on his eightieth birthday, 275
Hennepin County Tuberculosis Association's new plan to aid early diagnosis, 753
Hidden dangers in volatile gases, 710
Hospital insurance, 581
Loss and replacement of fluids after burns, 340
Medicine and the public weal, 497
More about the cost of medical care, 211
N. R. A. and the physician, 581
Our eightieth annual meeting, 495
Our political activities, 58
Ovarian extract and hemophilia, 140
Oversupply of nurses, 212
Pioneer Mutual Health and Benefit Insurance Company, 582
Relation of tobacco to circulatory disturbances of the lower extremities, The, 341
Saint Paul hospital service plan misrepresented, 275
Schools for medical technicians, 638
Shall I study medicine? 709
"Splint 'em where they lie," 59
State meeting, The, 339
Teaching value of the hospital out-patient department, 57
Technocracy, 139
Therapy of agranulocytic angina (malignant neutropenia), 273

F

Fahr, George: Tularemia following wood-tick bite (case report), 634
Far advanced case of hyperparathyroidism (case report), 269
Fatal postoperative pulmonary embolism, 409
Fear, The element of, in the development of functional disorders, 84
Fenger, E. P. K., Duncan, G. R., and Mariette, E. S.: The treatment of tuberculosis by hyperpyrexia, 510
Fever, Intermittent attacks of, resulting from partial bronchial obstruction with minimal pulmonary symptoms, 492
Fever, Undulant (brucelliasis), 661
Fever, Undulant, treated with metaphen, 335
Fibula, non-union of the, at birth (case report), 577
First infection type tuberculosis, 735
Fistulæ, branchial, The treatment of, with sclerosing fluids, 760
Fistula, intestinal, The prevention of excoriation of the skin in, with the use of yeast as a dressing, 450
Fistulas, Anal, 19
Flexor profundis digitorum, Avulsion of (case report), 434
Foley, Frederick E. B.: The new surgery of bladder neck obstruction, 240
Foot, Human: functional development and weaknesses, 323
Foreign bodies in the bladder (case report), 707
Fortney, A. C.: Undulant fever treated with metaphen, 335
Fracture, compression, of body of first lumbar vertebra, Reduction of, on a Gatch bed, 68
Fractures, intracapsular, of the hip, Treatment of, 263
Fractures of the upper and lower extremities, Emergency treatment of, 553
Fractures, The equipment necessary for the first aid treatment of, 8
Fracture work in the small community, 6
Fredericks, L. H.: Leukemia and its treatment, 296
Functional disorders, The element of fear in the development of, 84
Functional gastro-intestinal disturbances, 73

G

Gaarde, Fred W.: Some practical aspects of allergy, 32
Gallbladder, Diverticulum of the (case report), 209
Gallbladders, Some unusually large: a clinicopathologic study, 170
Gardner, E. L.: Calcium deficiency associated with functional gastro-intestinal disturbances in adults, 698
Discussion—Proceedings, Minnesota Academy of Medicine, 503
Gardner, Walter P.: The sciatic syndrome, 36
Gastric and duodenal ulcer: results of immunization treatment, 310
Gastro-intestinal disturbances, Functional, 73
Gastro-intestinal disturbances, functional, in adults, Calcium deficiency associated with, 698
General, local, spinal and balanced anesthesia, 572
General management of tuberculosis, 728
Genito-urinary tract, Congenital abnormalities of the, and their surgical treatment, 260
Gifford, B. L.: Eclampsia with ablatio placentæ and blood pressure of only 130 (case report), 578
Glandular fever, Acute mononucleosis or, 305
Goiter clinic (case report), 536
Gradual decompression of the biliary system, 15
Gratzek, Thomas: Mesenteric cyst, 532

Green, E. K.: Purpura with hematuria treated successfully with ovarian extract, 547
Green, E. K.: Report of the meeting of the International Medical Assembly, 216
Green, Robert G., Hartman, Howard R., and Beaver, Donald C.: The occurrence of tularemia in Minnesota in 1921: Report of two cases—one fatal, with necropsy report, 559
Gruenhagen, Arnold P.: Mixed tumor of the parotid (case report), 535
Guild medicine, What is, 164

H

Hamilton, A. S., and Dunn, G. R.: Neurofibroma of the ulnar nerve, 283
Hammes, E. M.: Convulsive states in adults from the neurologic standpoint, 199
Hard of hearing problem, The, 126
Hartman, Howard R., Beaver, Donald C., and Green, Robert G.: The occurrence of tularemia in Minnesota in 1921: Report of two cases—one fatal, with necropsy report, 559
Hassett, R. G., and Lloyd, H. J.: Abscess of the mediastinum, 257
Hayes, J. M.: Pyloric stenosis in a male 67 years of age, with a clinical picture of progressive pernicious anemia, 283
Hayes, J. M.: Treatment of acute infections of the extremities, 255
Hayes, J. M., and Richdorf, L. F.: Intestinal intussusception in infants, with report of an unusual case, 131
Hay fever, A survey of the causes of, for the state of Minnesota, 379
Hearing, The hard of, problem, 126
Heart, Distinction of the normal from the diseased, 468
Hempstead, Bert E.: Operative procedure in chronic suppurative otitis media with mastoiditis, 615
Hench, Philip S., and Judd, E. Starr: Coexistent chronic infectious (atrophic) arthritis and cholecystitis: results of cholecystectomy, 522
Henderson, Melvin S.: Some principles involved in health insurance, 161
Henderson, Melvin S.: The human foot: functional development and weaknesses, 323
Henry, Myron O.: Treatment of intracapsular fractures of the hip, 263
Hensel, Charles N.: Pitfalls in cardiac diagnosis, 457
Hernia, Ambulant treatment of, 446
Hernia, Diaphragmatic, 762
Hernia, inguinal, in males, Results of the surgical treatment of, 69
Hernia, The injection method in the treatment of, 447
Hewitt, Richard M.: An avocation for the male cardiac invalid, 345
High carbohydrate low calorie diet in the treatment of diabetes mellitus, 566
Hip, Treatment of intracapsular fractures of the, 263
Hirschboeck, F. J.: The achlorhydric anemias, 617
Histologic grading of squamous cell carcinoma of the lip, The, 473
Historical aspects of the Minnesota State Medical Association—President's Address, 505
Hoidale, A. D.: The element of fear in the development of functional disorders, 84
Hormones, sex, The, 28
Hospitalese, 345
Hospitals in Minnesota, 45
Hudson, George E.: The sex hormones, 28
Hufford, Alvin R.: Gastric and duodenal ulcer: results of immunization treatment, 310
Human foot: functional development and weaknesses, 323
Humerus, Isolated fracture of the lesser tuberosity of the (case report), 435
Hyperparathyroidism, Far advanced case of (case report), 269
Hypertension, malignant, Acute vasospastic hypertensive disease with transition into: final report of a case with necropsy, 186
Hypertensive disease, Acute vasospastic, with transition into malignant hypertension: final report of a case with necropsy, 186
Hypoplasia of the aorta as a possible cause of cardiac failure, 172

I

Ikeda, Kano: Hypoplasia of the aorta as a possible cause of cardiac failure, 172
Ikeda, Kano, and Richards, E. T. F.: Agranulocytosis, 299
Inclusion bodies, intranuclear, The distribution of, primarily involving vascular endothelium, 766
Indications for surgical interference in case of chronic suppurative otitis media with mastoiditis, 613
Indigent, Care of the, 219
Infants, Dacryocystitis in, 267
Infections, acute, of the extremities, Treatment of, 255
Infectious erythema, 628
Injection method in the treatment of hernia, The, 447
Insurance, health, Some principles involved in, 161
Intermittent attacks of fever resulting from partial bronchial obstruction with minimal pulmonary symptoms, 492
Intestinal intussusception in infants, with report of an unusual case, 131
Intestine, large, Malignant tumors of the, 763
Intravenous urography, 497
Intussusception, 405
Intussusception, Intestinal, in infants, with report of an unusual case, 131
Invalid, nervous, The appeal of quackery to the, 86
Isolated fracture of the lesser tuberosity of the humerus (case report), 435

J

Jeans, P. C.: Vitamin deficiency in childhood, 688
Johnson, Ellsworth, and Leddy, Eugene T.: The roentgen treatment of plantar warts, 574
Jones, E. Mendelssohn: Some clinical aspects of spinal injuries, 319
Jordan, K. B., and Jordan, L. S.: The menace of the tuberculous teacher, 555
Jordan, L. S., and Jordan, K. B.: The menace of the tuberculous teacher, 555
Josewich, Alexander: Simplified oleothorax, 512
Judd, E. Starr, and Castleton, Kenneth B.: Some unusually large gallbladders: a clinico-pathologic study, 170
Judd, E. Starr, and Hench, Philip S.: Coexistent chronic infectious (atrophic) arthritis and cholecystitis: results of cholecystectomy, 522

K

Karlins, W. H., and Lundquist, A. R.: Multiple myeloma, 318
Kidneys, ruptured, A case of, 66
Kliman, Frank E.: Office management of sterility cases, 134
Knight, Ralph T.: Postoperative evisceration, 548
Koenigsberger, Charles, Bannick, Edwin G., and Beaver, Donald C.: Acute vasospastic hypertensive disease with transition into malignant hypertension: final report of a case with necropsy, 186

L

Lake, George B.: Hospitalese, 345
Larson, Lawrence M.: Malignant tumors of the large intestine, 763
Larson, Lawrence M., and Borgen, J. Arnold: The mode of spread of carcinoma of the rectum, 478
Larson, Lawrence M., and Nordland, Martin: Goiter clinic (case report), 536

Larson, Lawrence M., and Nordland, Martin: Sarcoma of the uterine cervix, 745
Laryngeal disease, The diagnosis of, 101
Leddy, Eugene T., and Johnson, Ellsworth: The roentgen treatment of plantar warts, 574
Lee, H. M.: Results of the surgical treatment of inguinal hernia in males, 69
Leukemia and its treatment, 296
Leven, N. Logan, and Waldron, Carl M.: Presentation of a group of plastic cases, 445
Licentiates, Minnesota State Board of Medical Examiners,
November, 1932, 149
February, 1933, 286
Lillie, Harold I.: Indications for surgical interference in case of chronic suppurative otitis media with mastoiditis, 613
Lip, the histologic grading of squamous cell carcinoma of the, 473
Litholapaxy, 426
Litzenberg, Jennings C.: The status of obstetric practice in Minnesota, 287
Liver abscess, Subdiaphragmatic abscess and, 11
Liver, Primary carcinoma of the, 230
Lloyd, H. J., and Hassett, R. G.: Abscess of the mediastinum, 257
Localized myxedema, 765
Logefeil, Rudolph C.: Acute mononucleosis or glandular fever, 305
Logefeil, Rudolph C.: Metastatic carcinoma of tricuspid valve (case report), 539
Lommen, P. A.: Chronic anemia with splenomegaly and granulocytopenia (case report), 207
Low basal metabolic rates—a clinical study of states of lowered basal metabolism found in conditions other than myxedema, 396
Lues, Unsuspected, revealed by the routine Wassermann test, 43
Lundquist, A. R., and Karlins, W. H.: Multiple myeloma, 318
Lundy, J. S.: Anesthesia, 216
Lundy, John S.: General, local, spinal and balanced anesthesia, 572
Lundy, John S.: Remarks on certain special methods of anesthesia, 402
Lungs, Primary carcinoma of the, 1

Mc

McKenzie, Chas. H.: Some modifications in the apparatus for continuous nasal duodenal suction, 278
McKinney, Frank S.: The injection method in the treatment of hernia, 447

M

Majority and minority reports of the Committee on the Costs of Medical Care, 152
Malignant tumors of the large intestine, 763
Malnutrition, Treatment of, in adults, 681
Management of amebic dysentery, 748
Management of open safety pin in the digestive tract (case report), 338
Manson, M. H.: Amputations for diabetic gangrene, 448
Mariette, E. S.: General management of tuberculosis, 728
Mariette, E. S., Fenger, E. P. K., and Duncan, G. R.: The treatment of tuberculosis by hyperpyrexia, 510
Masson, James C., and Mueller, Selma C.: Septicemia following operation: Report of two cases, 631
Mastoiditis, Indications for surgical interference in case of chronic suppurative otitis media with, 613
Mastoiditis, Operative procedure in chronic suppurative otitis media with, 615
Maytum, Charles K., and Vinson, Porter P.: Intermittent attacks of fever resulting from partial bronchial obstruction with minimal pulmonary symptoms, 492
Mead, Charles H.: The prevention of excoriation of the skin in intestinal fistula with the use of yeast as a dressing, 450
Mediastinum, Abscess of the, 257
Medical Care, Committee on the Costs of, Majority and minority reports of the, 152
Medical care, The cost of. Why was the survey made? What results were expected from the survey? 147
Medical care, The minority report of the Committee on the Costs of, 156
Medical practice in Norway, 92
Medical profession versus racketeering, The, 715
Medical views of a country doctor, 129
Menace of the tuberculous teacher, The, 555
Mesenteric cyst, 532
Metabolic rates, Low basal—a clinical study of states of lowered basal metabolism found in conditions other than myxedema, 396
Metaphen, Undulant fever treated with, 335
Metastatic carcinoma of tricuspid valve (case report), 539
Michael, Joseph C.: Treatment of affective disorders, 81
Michelson, H. E.: The tuberculodermas of the face, 504
Mills, William, and Stewart, C. A.: A tuberculosis survey in a private hospital, 122
Minority report of the Committee on the Costs of Medical Care, 156
Mixed tumor of the parotid (case report), 535
Mode of spread of carcinoma of the rectum, The, 478
Modern conception of chronic arthritis, 719
Modern methods for caring for the deaf and hard of hearing, 251
Mononucleosis, Acute, or glandular fever, 305
Morton, Dr. Howard McIlvain, 754
Mucin, Use of, in the treatment of peptic ulcer, 314
Mueller, Selma C., and Masson, James C.: Septicemia following operation: Report of two cases, 631
Multiple myeloma, 318
Murray, John Gregory: The medical profession versus racketeering, 715
Myeloma, Multiple, 318
Myers, J. Arthur: First infection type tuberculosis, 735
Myxedema, Localized, 765

Miscellaneous

An avocation for the male cardiac invalid, 345
Committee on Public Health Education, 62, 142, 214, 277, 344, 442, 499, 545, 585, 640, 712, 757
Hospitalese, 345
Morton, Dr. Howard McIlvain, 754
President's letter, 60, 138, 210, 272, 338, 438, 494, 580, 636, 708, 750
Some modifications in the apparatus for continuous nasal duodenal suction, 278
Vaginismus, 440

N

Nagel, H. D.: Non-union of the fibula at birth (case report), 577
Nasal catheter suction siphonage: Its uses and the technique of its employment, 96
Nasal duodenal suction, continuous, Some modifications in the apparatus for, 278
Nervous invalid, The appeal of quackery to the, 86
Neurofibroma of the ulnar nerve, 283
Neurosis, Cardiac, 78
Newhart, Horace: Modern methods for caring for the deaf and hard of hearing, 251
New surgery of bladder neck obstruction, The, 240
Non-union of the fibula at birth (case report), 577
Nordland, Martin, and Larson, Lawrence M.: Goiter clinic (case report), 536

Nordland, Martin, and Larson, Lawrence M.: Sarcoma of the uterine cervix, 745
Norway, Medical practice in, 92
Nutrition, The role of vitamins in, 668

O

Observations on the deep Q wave in Lead III of the electrocardiogram, 694
Obstetric practice in Minnesota, The status of, 287
Occurrence of tularemia in Minnesota in 1921: Report of two cases—one fatal, with necropsy report, 559
Oerting, Harry: Systemic manifestations of avitaminosis, 679
Oerting, Harry, and Briggs, John Francis: Vasomotor response of normal and hypertensive individuals to thermal stimulus (cold), 481
Office management of sterility cases, 134
Oleothorax, Simplified, 512
Operative cystoscopy, 448
Operative procedure in chronic suppurative otitis media with mastoiditis, 615
Ophthalmology and oto-laryngology, Allergy in the field of, 390
Osteomyelitis of the ischium of the ramus, 503
Otitis media, chronic suppurative, Indications for surgical interference in case of, with mastoiditis, 613
Otitis media, chronic suppurative, Operative procedure in, with mastoiditis, 615
Otitis media, Conservative treatment of, 610
Oto-laryngology, ophthalmology and, Allergy in the field of, 390

Obituary

Allen, Mason, 639
Balcome, Frank E., 713
Bell, John W., 441
Bole, Robert Stewart, 758
Brown, Le Roy, 63
Burnes, Catherine A., 63
Cameron, John Archibald, 347
Cobb, Sheridan Grant, 63
Dewar, John E., 278
Deziel, Godfrey, 347
Dodge, Franklin A., 63
Dreisbach, Norman, 441
Geist, Emil S., 441
Graham, David, 758
Hegge, C. A., 64
Hirschfield, Adolph, 141
Kittleson, Theodore N., 213
Kriedt, Daniel, 141
Lyon, John Dexter, 502
McKeon, James, 639
Magie, William H., 64
O'Connor, Irwin A., 64
Richardson, Clarissa Clay, 347
Stierle, Adolph, 583
Stolpestad, Harold Lauritz, 713
Voges, A. E., 713
Wellner, George Christian, 278
Whitcomb, Edward H., 583
Wilson, Mrs. Louis B., 758

P

Paine, John R., and Wangensteen, Owen H.: Nasal catheter suction siphonage: Its uses and the technique of its employment, 96
Parotid, Mixed tumor of the (case report), 535
Pathology of bladder neck obstruction with particular reference to cystoscopic prostatectomy, 420
Pearce, N. O.: President, Minnesota State Medical Association, 1933, photograph, 56
Pearce, N. O.: President's Address: Historical aspects of the Minnesota State Medical Association, 505
Pellagra, non-alcoholic type, 503
Peptic ulcer, Use of mucin in the treatment of, 314
Pericardium, Clarification of (case report), 205
Pertl, A. L.: Diverticulum of the gallbladder (case report), 209
Pitfalls in cardiac diagnosis, 457
Pitfalls in the diagnosis of renal tumors, 235
Plastic cases, Presentation of a group of, 445
Pneumothorax, Spontaneous, 192
Postoperative evisceration, 548
Practical diabetic diets, 194
Prendergast, Harold J., and Culligan, John M.: Amidopyrine in diabetes insipidus (case report), 635
Prendergast, Harold J., and Culligan, John M.: Litholapaxy, 426
Preparing patients for operation on the prostate gland, 489
Presentation of a group of plastic cases, 445
Present day cancer problems, 330
Present-day surgical treatment of carcinoma of the rectum and rectosigmoid, 23
President's Address: Historical aspects of the Minnesota State Medical Association, 505
President's letter, 60, 138, 210, 272, 338, 438, 494, 580, 636, 708, 750
Prevention of excoriation of the skin in intestinal fistula with the use of yeast as a dressing, 450
Primary carcinoma of the liver, 230
Primary carcinoma of the lungs, 1
Proctoscopic diagnosis of chronic ulcerative colitis, 487
Prophylaxis of postoperative pulmonary atelectasis, 105
Prostatectomy, cystoscopic, Pathology of bladder neck obstruction with particular reference to, 420
Prostate gland, Preparing patients for operation on the, 489
Pulmonary atelectasis, Prophylaxis of, 105
Pupillary changes, The diagnostic significance of, 623
Purpura with hematuria treated successfully with ovarian extract, 547
Pyloric stenosis in a male 67 years of age, with a clinical picture of progressive pernicious anemia, 283

Q

Quackery, The appeal of, to the nervous invalid, 86
Q wave, deep, Observations on the, in Lead III of the electrocardiogram, 694

R

Randall, O. Samuel, and Beecham, Clayton: The clinical aspects of benign tumors of the stomach, 449
Rankin, Fred W.: Present-day surgical treatment of carcinoma of the rectum and rectosigmoid, 23
Rector, Frank L.: Present day cancer problems, 330
Rectosigmoid, rectum and, carcinoma of the, Present-day surgical treatment of, 23
Rectum and rectosigmoid, carcinoma of the, Present-day surgical treatment of, 23
Rectum, The mode of spread of carcinoma of the, 478
Reduction of compression fracture of body of first lumbar vertebra on a Gatch bed, 68
Remarks on certain special methods of anesthesia, 402
Renal tumors, Pitfalls in the diagnosis of, 235
Report of the meeting of the International Medical Assembly, 216
Reservoirs of echinococcus in Minnesota, 744
Richards, E. T. F., and Ikeda, Kano: Agranulocytosis, 299
Richardson, Harold E.: Cardiac neurosis, 78
Richdorf, L. F., and Hayes, J. M.: Intestinal intussusception in infants, with report of an unusual case, 131
Riley, William A.: Reservoirs of echinococcus in Minnesota, 744
Ritchie, Harry P.: Congenital clefts and scars following burns, 444
Rivers, Andrew B., and Vanzant, Frances R.: Use of mucin in the treatment of peptic ulcer, 314

Robitshek, E. C.: Foreign bodies in the bladder (case report), 707
Robitshek, E. C.: The treatment of branchial fistulæ with sclerosing fluids, 760
Rock, Robert E.: Management of amebic dysentery, 748
Rodda, F. C.: Intussusception, 405
Roentgen treatment of plantar warts, The, 574
Role of vitamins in nutrition, The, 668
Rosendahl, C. O., and Ellis, R. V.: A survey of the causes of hay fever in the state of Minnesota, 379
Rudolph, C. E.: Majority and minority reports of the Committee on the Costs of Medical Care, 152

S

Safety pin, open, Management of, in the digestive tract (case report), 338
Sarcoma of the uterine cervix, 745
Scammon, Richard E.: What is guild medicine, 164
Scars following burns, Congenital clefts and, 444
Schwartz, Virgil J.: Aniridia (case report), 705
Sciatic syndrome, The, 36
Septicemia following operation: Report of two cases, 631
Sex hormones, The, 28
Shapiro, M. J.: Coarctation of the aorta (case report), 704
Shapiro, M. J.: Modern conception of chronic arthritis, 719
Simons, Edwin J.: Primary carcinoma of the lungs, 1
Simplified oleothorax, 512
Simpson, Walter M.: Undulant fever (brucelliasis), 661
Sivertsen, Ivar: Medical practice in Norway, 92
Skin manifestations of avitaminosis, The, 670
Sleffens, L. F.: Appendicitis in the tuberculous, 742
Smith, Arthur Edward: The diagnostic significance of pupillary changes, 623
Sohlberg, O. I.: Vaginismus, 440
Some clinical aspects of spinal injuries, 319
Some modifications in the apparatus for continuous nasal duodenal suction, 278
Some practical aspects of allergy, 32
Some principles involved in health insurance, 161
Some unusually large gallbladders: A clinicopathologic study, 170
Some unusual surgical conditions of the duodenum, 451
Spinal injuries, Some clinical aspects of, 319
Spontaneous pneumothorax, 192
Stangl, Fred H.: Isolated fracture of the lesser tuberosity of the humerus (case report), 435
Stark, W. Berkeley: Clinical classification of chronic suppurative diseases of the middle ear, 609
Status of obstetric practice in Minnesota, The, 287
Sterility cases, Office management of, 134
Stewart, C. A., and Mills, William: A tuberculosis survey in a private hospital, 122
Stomach, Carcinoma of the, with bilateral ureteral metastasis (case report), 578
Stomach, the clinical aspects of benign tumors of the, 449
Subdiaphragmatic abscess and liver abscess, 11
Surgical consideration of cerebral lesions, 221
Survey of the causes of hay fever for the state of Minnesota, A, 379
Sweetser, Theodore H.: Pitfalls in the diagnosis of renal tumors, 235
Sweitzer, S. E.: Adequate therapy of syphilis, 557
Sweitzer, S. E.: Localized myxedema, 765
Sweitzer, S. E.: Pellagra, non-alcoholic type, 503
Sweitzer, S. E.: The skin manifestations of avitaminosis, 670
Syphilis, Adequate therapy of, 557
Syphilis, Adequate treatment of (discussion), 453
Systemic manifestations of avitaminosis, 679

Societies

American Association for the Study of Goiter, 64, 280
American Congress of Physical Therapy, 280, 502
American Proctologic Society, 443
American Urologic Association, 215
Blue Earth County Society, 215
Hennepin County Medical Society, 443
International Medical Assembly, Report of the meeting of the, 216
Mayo Foundation lectures and demonstrations in medicine, 215
Medical Alumni Association, 584, 643
Medical broadcast for the month, 64, 141, 215, 280, 347, 443, 502, 546, 583, 642, 714, 758
Medical economics meeting, 65
Minneapolis Surgical Society, 67, 143, 216, 281, 283, 760
Minnesota Academy of Medicine, 66, 145, 282, 353, 765
Minnesota Radiological Society, 215, 502, 759
Minnesota State Medical Association
Announcement of meeting, 141
Program, 348
Report of Eightieth Annual Meeting, 586 and 644
Roster, 357
State meeting, 1934, 758
Mower County Society, 215
Northern Minnesota Medical Association, 583, 642
Red River Valley Society, 66, 347
Redwood-Brown County, 141, 443
Renville County Society, 642
Rice County Society, 66, 347
Saint Louis County Society, 443
Scott-Carver County Society, 546
Southern Minnesota Medical Association, 546, 714
Southwestern Minnesota Medical Society, 443, 759
State meeting, The (1933), 65, 280
State meeting, The (1934), 546, 714
Stearns-Benton Society, 66, 502
Stearns-Benton and Upper Mississippi joint meeting, 643
Upper Mississippi Medical Association, 215
Wabasha County Medical Society, 546
Wabasha and Winona County Societies, 347
Washington County Society, 66
Woman's Auxiliary, 281, 353, 643, 759

T

Tavenner, J. L.: Far advanced case of hyperparathyroidism (case report), 269
Tilderquist, D. L.: Eye manifestations of avitaminosis, 675
Transplantation of the ureters to the sigmoid colon for exstrophy of the bladder and other urethral abnormalities with urinary incontinence, 416
Treatment of acute infections of the extremities, 255
Treatment of affective disorders, 81
Treatment of branchial fistulæ with sclerosing fluids, 760
Treatment of intracapsular fractures of the hip, 263
Treatment of malnutrition in adults, 681
Treatment of tuberculosis by hyperpyrexia, The, 510
Trichomonas vaginalis in the male urethra, 453
Trichomonas vaginalis vaginitis, 354
Tricuspid valve, Metastatic carcinoma of (case report), 539
Tuberculodermas of the face, The, 504
Tuberculosis, First infection type, 735
Tuberculosis, General management of, 728
Tuberculosis survey in a private hospital, A, 122
Tuberculosis, The treatment of, by hyperpyrexia, 510
Tuberculous, Appendicitis in the, 742
Tuberculous individuals, Correlation between clinical and x-ray findings in, 119
Tuberculous teacher, The menace of the, 555
Tularemia following wood-tick bite (case report), 634

Tularemia, Occurrence of, in Minnesota, in 1921: Report of two cases—one fatal, with necropsy report, 559
Tumors, benign, of the stomach, The clinicil aspects of, 449
Tumors, Malignant, of the large intestine, 763
Tumors, renal, Pitfalls in the diagnosis of, 235

U

Ulcer, peptic, Use of mucin in the treatment of, 314
Ulnar nerve, Neurofibroma of the, 283
Undulant fever (brucelliasis), 661
Undulant fever treated with metaphen, 335
Unsuspected lues revealed by the routine Wassermann test, 43
Ureters, Transplantation of the, to the sigmoid colon for exstrophy of the bladder and other urethral abnormalities with urinary incontinence, 416
Urology in middle Europe, 428
Use of mucin in the treatment of peptic ulcer, 314
Uterine cervix, Sarcoma of the, 745

V

Vaginismus, 440
Vanzant, Frances R., and Rivers, Andrew, B.: Use of mucin in the treatment of peptic ulcer, 314
Vasomotor response of normal and hypertensive individuals to thermal stimulus (cold), 481
Vinson, Porter P., and Maytum, Charles K.: Intermittent attacks of fever resulting from partial bronchial obstruction with minimal pulmonary symptoms, 492
Vitamin deficiency in childhood, 688
Vitamins, The role of, in nutrition, 668

W

Waldron, Carl M., and Leven, N. Logan: Presentation of a group of plastic cases, 445
Walters, Waltman: Congenital abnormalities of the genito-urinary tract and their surgical treatment, 260
Walters, Waltman: Transplantation of the ureters to the sigmoid colon for exstrophy of the bladder and other urethral abnormalities with urinary incontinence, 416
Wangensteen, Owen H.: Some unusual surgical conditions of the duodenum, 451
Wangensteen, Owen H., and Paine, John R.: Nasal catheter suction siphonage: Its uses and the technic of its employment, 96
Warts, plantar, The roentgen treatmcnt of, 574
Wassermann test, Unsuspected lues revealed by the routine, 43
Watson, B. A.: High carbohydratc low calorie diet in the treatment of diabetes mellitus, 566
Watson, J. A.: Allergy in the field of ophthalmology and oto-laryngology, 390
Webb, R. C.: Emergency treatment of fractures of the upper and lower extremities, 553
Webb, R. C.: Reduction of compression fracture of body of first lumbar vertebra on a Gatch bed, 68
Webb, Roscoe C.: The equipment necessary for the first aid treatment of fractures, 8
West, Olin: The minority report of the Committee on the Costs of Medical Care, 156
What is guild medicine, 164
Wheeler, Merrit W.: The hard of hearing problem, 126
Wilcox, A. E.: A case of ruptured kidneys, 66
Williams, R. V.: Medical views of a country doctor, 129
Williams, R. V.: Spontaneous pneumothorax, 192
Willius, Frederick A.: Distinction of the normal from the diseased heart, 468
Wright, Charles B.: Functional gastro-intestinal disturbances, 73
Wright, F. R.: Trichomonas vaginalis in the male urethra, 453

Y

Yoerg, O. W.: Diaphragmatic hernia, 762

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